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# 1987

## Census of Manufactures

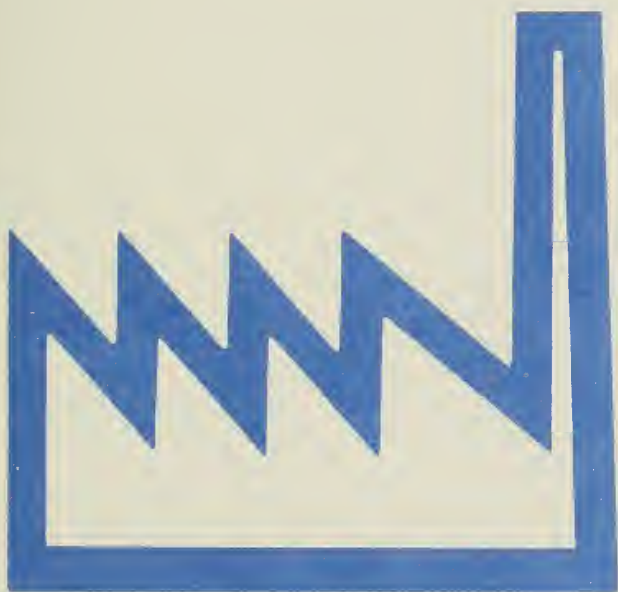
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MC87-I-35H

INDUSTRY SERIES

### Miscellaneous Machinery, Except Electrical

Industries 3592, 3593, 3594, 3596, and 3599



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The overall planning and review of the census operations were performed by the staff of the Office of the Assistant Director for Economic and Agriculture Censuses.

This report was prepared in the Industry Division. **John Govoni**, Assistant Chief for Census/ASM Programs, was responsible for the overall planning, management, and coordination of the census of manufactures. Planning and implementation were under the direction of **Kenneth I. Hansen**, Chief, Census/ASM Durable Branch, assisted by **Charles T. Lee, Jr.**, Section Chief, with primary data analysis responsibilities performed by **Raphael S. Corrado**.

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If you have any questions concerning the statistics in this report, call (301) 763-7304.

# **1987**

# **Census of**

# **Manufactures**

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**U.S. Department of Commerce**  
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**Charles A. Waite**, Associate Director for  
Economic Programs  
**Roger H. Bugenhagen**, Assistant Director for  
Economic and Agriculture Censuses

**Thomas L. Mesenbourg**, Chief,  
Economic Census Staff

**INDUSTRY DIVISION**  
**Gaylord E. Worden**, Chief

---

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# INTRODUCTION

## PURPOSE AND USES OF THE ECONOMIC CENSUSES

The economic censuses are the major source of facts about the structure and functioning of the Nation's economy. They provide essential information for government, business, industry, and the general public.

*Economic censuses furnish an important part of the framework for such composite measures as the gross national product, input-output measures, production and price indexes, and other statistical series that measure short-term changes in economic conditions.*

*Policy-making agencies of the Federal Government use the data, especially in monitoring economic activity and providing assistance to business.*

*State and local governments use the data to assess business activities and tax bases within their jurisdictions and to develop programs to attract business.*

*Trade associations study trends in their own and competing industries, and keep their members informed of market changes.*

*Individual businesses use the data to locate potential markets and to analyze their own production and sales performance relative to industry or area averages.*

## AUTHORITY AND SCOPE

Title 13 of the United States Code (sections 131, 191, and 224) directs the Census Bureau to take the economic censuses every 5 years, covering years ending in 2 and 7. The 1987 Economic Censuses consist of the

- Census of Retail Trade
- Census of Wholesale Trade
- Census of Service Industries
- Census of Transportation
- Census of Manufactures
- Census of Mineral Industries
- Census of Construction Industries

Special programs also cover enterprise statistics and minority-owned and women-owned businesses. (The 1987 Census of Agriculture and 1987 Census of Governments are conducted separately.) The next economic censuses are scheduled to be taken in 1993 covering the year 1992.

## AVAILABILITY OF THE DATA

The results of each of the economic censuses are available in printed reports, for sale by the U.S. Government Printing Office, and on microfiche, computer tape, compact discs with read-only memory, and flexible diskettes, for sale by the Census Bureau. Order forms for all types of products are available on request from Customer Services, Census Bureau, Washington, DC 20233. A more complete description of publications being issued from this census is on the inside back cover of this document.

Census facts are also widely disseminated by trade associations, business journals, and newspapers. Volumes containing census statistics are available in most major public and college libraries. Finally, State Data Centers in every State and Business and Industry Data Centers in many States also supply economic census statistics.

## WHAT'S NEW IN 1987

Several changes have taken place for the 1987 censuses. Data will be reported on the basis of the newly revised Standard Industrial Classification (SIC) system with selected reports including "bridge tables," linking the old and new classification systems. A new set of metropolitan areas has been adopted, and more detailed information will be available for businesses with no paid employees. For additional information on these changes, review the subsequent text.

## HISTORICAL INFORMATION

The economic censuses have been taken together as an integrated program at 5-year intervals since 1967, and before that for 1963, 1958, and 1954. Prior to that time, the individual censuses were taken separately at varying intervals.

The economic censuses trace their beginnings to the 1810 Decennial Census, when questions on manufacturing were included with those for population. Coverage of economic activities was expanded for 1840 and subsequent censuses to include mining and some commercial



activities. In 1902, Congress established a permanent Census Bureau and directed that a census of manufactures be taken every 5 years. The 1905 manufactures census was the first time a census was taken apart from the regular every-10-year population census.

The first census of business was taken in 1930, covering 1929. Initially it covered retail and wholesale trade, and construction industries, but it was broadened in 1933 to include some of the service trades.

The 1954 economic censuses were the first to be fully integrated—providing comparable census data across economic sectors, using consistent time periods, concepts, definitions, classifications, and reporting units. These were the first censuses to be taken by mail, using lists of firms provided by the administrative records of other federal agencies. Since 1963, administrative records have also been used to provide basic statistics as well for very small firms, reducing or eliminating the need to send them census questionnaires. The Enterprise Statistics Program, which publishes combined data from the economic censuses, was made possible with the implementation of the integrated census program in 1954.

The range of industries covered in the economic censuses has continued to expand. The Census of Construction Industries began on a regular basis in 1967, and the scope of service industries was broadened in 1967, 1977, and 1987. The Census of Transportation began in 1963 as a set of surveys covering travel, transportation of commodities, and trucks. New for 1987 are publications reporting on business establishments engaged in several transportation industries, paralleling the data on establishments in other sectors. This is part of a gradual expansion in coverage of industries previously subjected to government regulation. The Survey of Minority-Owned Business Enterprises was first conducted as a special project in 1969 and was incorporated into the economic censuses in 1972 along with the Survey of Women-Owned Businesses.

Economic censuses have also been taken in Puerto Rico since 1909, in the Virgin Islands and Guam since 1958, and in the Northern Mariana Islands since 1982.

Statistical reports from the 1982 and earlier censuses provide historical figures for the study of long-term time series, and are available in some large libraries. All of the census data published since 1967 are still available for sale on microfiche from the Census Bureau.

## AVAILABILITY OF MORE FREQUENT ECONOMIC DATA

While the censuses provide complete enumerations every 5 years, there are many needs for more frequent data as well. The Census Bureau conducts a number of monthly, quarterly, and annual surveys, the results of which appear in publication series such as *Current Business Reports* (retail and wholesale trade and service industries), the *Annual Survey of Manufactures*, *Current Industrial Reports*, and the *Quarterly Financial Report*. Most of these surveys, while providing more frequent

observations, yield less kind-of-business and geographic detail than the censuses. The *County Business Patterns* program offers annual statistics on the number of establishments, employment, and payroll classified by industry within each county.

## SOURCES FOR MORE INFORMATION

More information about the scope, coverage, classification system, data items, and publications for each of the economic censuses and related surveys is published in the *Guide to the 1987 Economic Censuses and Related Statistics*. More information on the methodology, procedures, and history of the censuses will be published in the *History of the 1987 Economic Censuses*. Contact Customer Services for information on availability.

## CENSUS OF MANUFACTURES

### General

This report, from the 1987 Census of Manufactures, is one of a series of 83 industry reports, each of which provides statistics for individual industries or groups of related industries. Additional separate reports will be issued for each State and the District of Columbia and for special subjects such as type of organization, distribution of sales by class of customer, concentration ratios and water use in manufacturing.

The industry reports include such statistics as number of establishments, employment, payroll, value added by manufacture, cost of materials consumed, capital expenditures, product shipments, etc.

State reports present similar statistics for each State and its important metropolitan statistical areas (MSA's), counties, and places. Selected statistical totals for "all manufacturing" have been shown in the State reports for MSA's with 250 employees or more and for counties and places with 450 employees or more.

The *General Summary* report will contain industry, product class, and geographic area statistics summarized in one report. The introduction to the *General Summary* discusses, at greater length, many of the subjects described in this introduction. For example, the *General Summary* text will discuss the relationship of value added by manufacture to National income by industry of origin, the changes in statistical concepts over the history of the censuses, and the valuation problems arising from intracompany transfers between manufacturing plants of a company and between manufacturing plants and sales offices and sales branches of a company.

### Scope of Census and Definition of Manufacturing

The 1987 Census of Manufactures covers all establishments with one paid employee or more primarily engaged in manufacturing as defined in the *1987 Standard Industrial*



*Classification (SIC) Manual*<sup>1</sup>. This is the system of industrial classification developed by experts on classification in Government and private industry under the guidance of the Office of Information and Regulatory Affairs, Office of Management and Budget. This classification system is used by Government agencies as well as many organizations outside the Government.

The SIC Manual defines manufacturing as the mechanical or chemical transformation of substances or materials into new products. The assembly of component parts of products also is considered to be manufacturing if the resulting product is neither a structure nor other fixed improvement. These activities are usually carried on in plants, factories, or mills that characteristically use power-driven machines and materials-handling equipment.

Manufacturing production is usually carried on for the wholesale market, for transfers to other plants of the same company, or to the order of industrial users rather than for direct sale to the household consumer. Some manufacturers in a few industries sell chiefly at retail to household consumers through the mail, through house-to-house routes, or through salespersons. Some activities of a service nature (enameling, engraving, etc.) are included in manufacturing when they are performed primarily for trade. They are considered nonmanufacturing when they are performed primarily to the order of the household consumer.

## **Relationship Between Annual Survey of Manufactures and Census of Manufactures**

The Bureau of the Census conducts the annual survey of manufactures (ASM) in each of the 4 years between the censuses of manufactures. The ASM is a probability-based sample of approximately 56,000 establishments and collects the same industry statistics (employment, payroll, value of shipments, etc.) as the census of manufactures. In addition to collecting the information normally requested on the census form, the establishments in the ASM sample are requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, costs of purchased services, and foreign content of materials consumed. Except for supplemental labor costs, the extra ASM items are collected only in census years.

## **Establishment Basis of Reporting**

The census of manufactures is conducted on an establishment basis. A company operating at more than one location is required to file a separate report for each location. The ASM also is conducted on an establishment basis, but separate reports are filed for just those establishments selected in the sample. Companies engaged in

distinctly different lines of activity at one location are requested to submit separate reports if the plant records permit such a separation and if the activities are substantial in size.

In 1987, as in earlier years, a minimum size limit was set for inclusion of establishments in the census. All establishments employing one person or more at any time during the census year are included. The same size limitation has applied since 1947 in censuses and annual surveys of manufactures. In the 1939 and earlier censuses, establishments with less than \$5,000 value of products were excluded. The change in the minimum size limit in 1947 does not appreciably affect the historical comparability of the census figures except for data on number of establishments for a few industries. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units that service manufacturing establishments of the same company (see Auxiliaries).

## **Manufacturing Universe and Census Report Forms**

The 1987 Census of Manufactures universe includes approximately 350,000 establishments. The amounts of information requested from manufacturing establishments were dependent upon a number of factors. The more important considerations were the size of the company and whether it was included in the annual survey of manufactures. The methods of obtaining information for the various subsets of the universe to arrive at the aggregate figures shown in the publication are described below:

### **1. Small Single-Establishment Companies Not Sent a Report Form**

In the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of these small establishments was done on an industry-by-industry basis and was based on annual payroll and total shipments data as well as on the industry classification codes contained in the administrative records of Federal agencies. The cutoffs were selected so that these administrative-records cases would account for no more than 3 percent of the value of shipments for all manufacturing. Generally, all single-establishment companies with less than five employees were excused, while all establishments with more than 20 employees were mailed forms.

Information on the physical location of the establishment, as well as information on payrolls, receipts (shipments), and industry classification, was obtained from the administrative records of other Federal agencies under special arrangements, which safeguarded their confidentiality. Estimates of data for these small establishments were developed using industry averages in conjunction with the administrative information. The value of shipments and cost of materials

<sup>1</sup>Standard Industrial Classification Manual: 1987: For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Stock No. 041-001-00314-2.



were not distributed among specific products and materials for these establishments but were included in the product and material "not specified by kind" (n.s.k.) categories.

The industry classification codes included in the administrative-records files were assigned on the basis of brief descriptions of the general activity of the establishment. As a result, an indeterminate number of establishments were erroneously coded at the four-digit SIC level. This was especially true whenever there was a relatively fine line of demarcation between industries or between manufacturing and nonmanufacturing activity.

Sometimes these administrative-record cases were only given a two- or three-digit SIC group. For the 1987 Census of Manufactures, these establishments were sent a separate classification form, which requested information on the products and services of the establishment. This form was used to code many of these establishments to the four-digit SIC level. Establishments that did not return the classification form were coded later to those four-digit SIC industries identified as "not elsewhere classified" (n.e.c.) within the given two- or three-digit industry groups.

As a result of these situations, a number of small establishments may have been misclassified by industry. However, such possible misclassification has no significant effect on the statistics other than on the number of companies and establishments.

The total establishment count for individual industries should be viewed as an approximation rather than a precise measurement. The counts for establishments with 20 employees or more are far more reliable than the count of total number of establishments.

## 2. Establishments Sent a Report Form

The 200,000 establishments covered in the mail canvass were divided into three groups:

- a. **ASM sample establishments**—This group consisted of approximately 56,000 establishments covering all the units of large manufacturing establishments as well as a sample of the medium and smaller establishments. The probability of selection was proportionate to size (see appendix, Annual Survey of Manufactures).

In a census of manufactures year, the ASM report form (MA-1000) replaces the first page of the regular census form for those establishments included in the ASM. In addition to information on employment, payroll, and other items normally requested on the regular census form, establishments in the ASM sample were requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, and costs of purchased services. See appendix A, section 2, for an explanation of these items.

The census part of the report form is one of approximately 200 versions containing product, material, and special inquiries. The diversity of manufacturing activities necessitated the use of these many forms to canvass the 459 manufacturing industries. Each form was developed for a group of related industries.

Appearing on each form was a list of products primary to the group of related industries as well as secondary products and miscellaneous services that establishments classified in these industries were likely to be performing. Respondents were requested to identify the products, the value of each product, and, in a large number of cases, the quantity of the product shipped during the survey year. Space also was provided for the respondent to describe products not specifically identified on the form.

The report form also contained a materials-consumed inquiry, which varied from form to form depending on the industries being canvassed. The respondents were asked to review a list of materials generally used in their production processes. From this list, each establishment was requested to identify those materials consumed during the survey year, the cost of each, and, in certain cases, the quantity consumed. Once again, space was provided for the respondent to describe significant material not identified on the form.

Finally, a wide variety of special inquiries was included to measure activities peculiar to a given industry, such as operations performed and equipment used.

- b. **Large and medium establishments (non-ASM)**—Approximately 84,000 establishments were included in this group. A variable cutoff, based on administrative-records payroll data and determined on an industry-by-industry basis, was used to select those establishments that were to receive one of the approximately 200 census of manufactures regular forms. The first page, requesting establishment data for items such as employment and payroll, was standard but did not contain the detailed statistics included on the ASM form. The product, material, and special inquiry sections supplied were based on the historical industry classification of the establishment.
- c. **Small single-establishment companies (non-ASM)**—This group consisted of approximately 60,000 establishments. For those industries where application of the variable cutoff for administrative-records cases resulted in a large number of small establishments being included in the mail canvass, an abbreviated or "short" form was used. These establishments received one of the approximately 80 versions of the short form, which requested



summary product and material data and totals but no details on employment, payrolls, cost of materials, inventories, and capital expenditures.

Use of the short form has no adverse effect on published totals for the industry statistics; the same data were collected on the short form as on the long form. However, detailed information on materials consumed was not collected on the short form; thus its use would increase the value of the n.s.k. categories.

## Auxiliaries

In this industry report, the data on employment and payroll are limited to operating manufacturing establishments. The census report form filed for auxiliaries (ES-9200) requested a description of the activity of the establishments serviced. However, the manufacturing auxiliaries were coded only to the two-digit major group of the establishments they served; whereas, the operating establishments were coded to a four-digit manufacturing industry. Data for the approximately 10,000 separately operated auxiliaries are included in the geographic area series and in a report issued as part of the 1987 Enterprise Statistics Survey.

Auxiliaries are establishments whose employees are primarily engaged in performing supporting services for other establishments of the same company, rather than for the general public or for other business firms. They can be at different locations from the establishments served or at the same location as one of those establishments but not operating as an integral part thereof and serving two establishments or more. Where auxiliary operations are conducted at the same location as the manufacturing operation and operate as an integral part thereof, they usually are included in the report for the operating manufacturing establishment.

Included in the broad category of auxiliaries are administrative offices. Employees in administrative offices are concerned with the general management of multiestablishment companies, i.e., with the general supervision and control of two units or more, such as manufacturing plants, mines, sales branches, or stores. The functions of these employees may include (1) program planning, including sales research and coordination of purchasing, production, and distribution; (2) company purchasing, including general contracts and purchasing methods; (3) company financial policy and accounting; (4) general engineering, including design of product machinery and equipment, and direction of engineering effort conducted at the individual operation locations; (5) direction of company personnel matters; and (6) legal and patent matters.

Other types of auxiliaries serving the plants or central management of the company include purchasing offices, sales promotion offices, research and development organizations, etc.

## Industry Classification of Establishments

Each of the establishments covered in the census was classified in 1 of 459 manufacturing industries in accordance with the industry definitions in the 1987 SIC Manual. The 1987 edition of this manual represents a major revision for manufacturing industries from the 1972 edition and its 1977 supplement. Appendix A of the 1987 Manual notes the revisions in the four-digit industry levels between 1972/77 and 1987.

An industry is generally defined as a group of establishments producing the same product or a closely related group of products. The product groupings from which industry classifications are derived are based on considerations such as similarity of manufacturing processes, types of materials used, types of customers, and the like. The resulting group of establishments must be significant in terms of number, value added by manufacture, value of shipments, and number of employees. The system operates in such a way that the definitions progressively become narrower with successive additions of numerical digits. For 1987, there are 20 major groups (two-digit SIC), 139 industry groups (three-digit SIC), and 459 industries (four-digit SIC). This represents an expansion of four-digit industries from 452 in 1972/77 and a reduction of three-digit groups from 143 in 1972/77. Product classes and products of the manufacturing industries have been assigned codes based on the industry from which they originate. There are about 11,000 products identified by a seven-digit code. The seven-digit products are considered the primary products of the industry with the same four digits.

Accordingly, an establishment is usually classified in a particular industry on the basis of its major activity during a particular year, i.e., production of the products primary to that industry exceeds, in value, production of the products primary to any other single industry. In a few instances, however, the industry classification of an establishment is not only determined by the products it makes but also by the process employed in operations. Refining of nonferrous metals from ore or rolling and drawing of nonferrous metals (processes which involve heavy capitalization in specialized equipment) would be classified according to the process used during a census year. These establishments then would be "frozen" in that industry during the following ASM years.

In either a census or ASM year, establishments included in the ASM sample with certainty weight, other than those involved with heavily capitalized activities described above, are reclassified by industry only if the change in the primary activity from the prior year is significant or the change has occurred for 2 successive years. This procedure prevents reclassification when there are minor shifts in product mix.

In ASM years, establishments included in the ASM sample with noncertainty weight are not shifted from one industry classification to another. They are retained in the industry where they were classified in the base census year (see appendix, Annual Survey of Manufactures).



However, in the following census year, these ASM plants are allowed to shift from one industry to another.

The result of these rules covering the switching of plants from one industry classification to another is that, at the aggregate level, some industries comprise different mixes of establishments between survey years, and establishment data for such industry statistics as employment and payroll may be tabulated in different industries between survey years. Hence, comparisons between prior-year and current-year published totals, particularly at the four-digit SIC level, should be viewed with caution. This is particularly true for the comparison between the data shown for a census year versus the data shown for the previous ASM year.

As previously noted, the small establishments that may have been misclassified by industry are usually administrative-record cases whose industry codes were assigned on the basis of incomplete descriptions of the general activity of the establishment. Such possible misclassifications have no significant effect on the statistics other than on the number of companies and establishments.

While some establishments produce only the primary products of the industry in which they are classified, all establishments of an industry rarely specialize to this extent. The industry statistics (employment, inventories, value added by manufacture, total value of shipments including resales and miscellaneous receipts, etc.) shown in tables 1a through 5a, therefore, reflect not only the primary activities of the establishments in that industry but also their secondary activities. The product statistics in table 6a represent the output of all establishments whether or not they are classified in the same industry as the product. For this reason, in relating the industry statistics, especially the value of shipments to the product statistics, the composition of the industry's output shown in table 5b should be considered.

The extent to which industry and product statistics may be matched with each other is measured by two ratios which are computed from the figures shown in table 5b. The first of these ratios, called the primary product specialization ratio, measures the proportion of product shipments (both primary and secondary) of the establishments classified in the industry represented by the primary products of those establishments. The second ratio, called the coverage ratio, is the proportion of primary products shipped by the establishments classified in the industry to total shipments of such products by all manufacturing establishments.

However, establishments making products falling into the same industry category may use a variety of processes and materials to produce them. Also, the same industry classification (based on end products) may include both establishments that are highly integrated and those that put only the finishing touches on an already highly fabricated item. For example, the refrigeration equipment industry includes instances of almost complete integration (production of the compressor, condensing unit, electric motor, casting, stamping of the case, and final assembly) all

carried on at one plant. On the other hand, the condensing unit, the motor, and the case may be purchased and only assembled into the finished product.

In some instances, separate industry categories have been established for integrated and nonintegrated establishments. For other industries, the census provides separate statistics on the production of intermediate commodities made and used in the producing plant. For some industries characterized by many plants of the same company, separate figures on interplant transfers of products usually are shown.

Differences in the integration of production processes, types of operations, and alternatives in types of materials used should be considered when relating the industry statistics (employment, payrolls, value added, etc.) to the product and material data.

## **Value of Shipments for the Industry Compared With Value of Product Shipments**

This report shows value of shipments data for industries and products. In tables 1a through 5a, these data represent the total value of shipments of all establishments classified in a particular industry. The data include the shipments of the products classified in the industry (primary to the industry), products classified in other industries (secondary to the industry), and miscellaneous receipts (repair work, sale of scrap, research and development, installation receipts, and resales). Value of product shipments shown in table 6a represents the total value of all products shipped that are classified as primary to an industry.

## **CENSUS DISCLOSURE RULES**

In accordance with Federal law governing census reports, no data are published that would disclose the data for an individual establishment or company. However, the number of establishments classified in a specific industry is not considered a disclosure, so this information may be released even though other information is withheld.

The disclosure analysis for the industry statistics in tables 1a through 5a of this report is based on the total value of shipments. When the total value of shipments cannot be shown without disclosing information for individual companies, the complete line is suppressed. However, the suppressed data are included in higher-level totals. Additional disclosure analysis is performed for new capital expenditures that can be suppressed even though value of shipments data are publishable.

## **SPECIAL TABULATIONS**

Special tabulations of data collected in the 1987 Census of Manufactures may be obtained on computer tape or in tabular form. The data will be in summary form and subject to the same rules prohibiting disclosure of confidential

information (including name, address, kind of business, or other data for individual business establishments or companies) as are the regular publications.

Special tabulations are prepared on a cost basis. A request for a cost estimate, as well as exact specifications on the type and format of the data to be provided, should be directed to the Chief, Industry Division, Bureau of the Census, Washington, DC 20233.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in this publication:

- Represents zero.
- (D) Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
- (NA) Not available.
- (NC) Not comparable.
- (S) Withheld because estimate did not meet publication standards.
- (X) Not applicable.
- (Z) Less than half the unit shown.
- do Ditto.

- n.e.c. Not elsewhere classified.
- n.s.k. Not specified by kind.
- pt. Part.
- r Revised.
- SIC Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone
Census/ASM		
Durables	Kenneth Hansen	(301) 763-7304
Nondurables	Michael Zampogna	(301) 763-2510
Current Industrial Reports		
Durables	Malcolm Bernhardt	(301) 763-2518
Nondurables	Thomas Flood	(301) 763-5911
Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356



# Users' Guide for Locating Statistics in This Report by Table Number

For explanation of terms, see appendixes

Item	Four-digit industry statistics							Five-digit product class and seven-digit product statistics			
	Histori- cal	Operat- ing ratios	By geo- graphic area	Sum- mary and supple- mental	By employ- ment size	By industry and product class special- ization	Materials con- sumed by kind	Industry- product analysis	Product ship- ments	Product class by geo- graphic area	Historical product class
Number of companies . . . . .	1a			3a					*6a		
Number of establishments . . .	1a		2	3a	4	5a					
Employment and payroll: . . . .											
Number of employees . . . . .	1a	1b	2	3a	4	5a					
Payroll . . . . .	1a	1b	2	3a	4	5a					
Supplemental labor costs . . .				3a							
Production workers . . . . .	1a	1b	2	3a	4	5a					
Production- worker hours . . .	1a	1b	2	3a	4	5a					
Production- worker wages . . .	1a	1b	2	3a	4	5a					
Shipments, cost of materials, and value added:											
Value of shipments (four-digit) . . . . .	1a	1b	2	3a	4	5a		5b			
Product class shipments (five-digits) . . . . .									6a	6b	6c
Product shipments (seven-digit) . . . . .									6a		
Value added by manufacture . . . . .	1a	1b	2	3a	4	5a					
Cost of materials . . . . .	1a	1b	2	3a	4	5a					
Fuels and electric energy . . .				3a							
Materials consumed by kind .							7				
Inventories:											
Total, end of year . . . . .	1a			3a	4						
By stage of fabrication . . . .				3a							
Capital expenditures, assets, rental payments, and purchased services:											
New capital expenditures . . .	1a		2	3b	4	5a					
Used plant and equipment expenditures . . . . .				3b							
Gross assets . . . . .				3b							
Depreciation . . . . .				3b							
Retirements of buildings and machinery . . . . .				3b							
Rental payments . . . . .				3b							
Foreign content of materials consumed . . . . .				3c							
Purchased services . . . . .				3c							
Ratios:											
Specialization . . . . .	1a			3a				5b			
Coverage . . . . .	1a			3a				5b			

\*Number of companies with shipments of more than \$100 thousand.



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# DESCRIPTION OF INDUSTRIES AND SUMMARY OF FINDINGS

This report shows 1987 Census of Manufactures statistics for establishments classified in each of the following industries:

## SIC code and title

3592	Carburetors, Pistons, Rings, and Valves
3593	Fluid Power Cylinders and Actuators
3594	Fluid Power Pumps and Motors
3596	Scales and Balances, Except Laboratory
3599	Industrial Machinery, N.E.C.

The industry statistics (employment, payroll, cost of materials, value of shipments, inventories, etc.) are reported for each establishment as a whole. Aggregates of such data for an industry reflect not only the primary activities of the establishments but also their activities in the manufacture of secondary products as well as their miscellaneous activities (contract work on materials owned by others, repair work, etc.). This fact should be taken into account when comparing industry statistics (tables 1 through 5a) with product statistics (table 6) showing shipments by all industries of the primary products of the specified industry. The extent of the "product mix" is indicated in table 5b, which shows the value of primary and secondary products shipped by establishments classified in the specified industry and the value of primary products of the industry shipped as secondary products by establishments classified in other industries.

Small single-establishment companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. For these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated), data on payrolls and receipts were obtained from administrative records of other Federal agencies. The remaining statistics were developed from industry averages.

Establishment data were tabulated based on industry definitions included in the 1987 Standard Industrial Classification (SIC) Manual<sup>1</sup>. The 1987 edition represents a major revision for manufacturing industries from the 1972 edition and its 1977 supplement. In addition to the 1987 SIC revision, changes were made to the product class (five-digit) and product code (seven-digit) categories. The

product class and product code comparability between the 1987 and 1982 censuses is shown in the appendixes. These appendixes present, in tabular form, the linkage from 1987 to 1982.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

## INDUSTRY 3592, CARBURETORS, PISTONS, RINGS, AND VALVES

This industry is made up of establishments primarily engaged in manufacturing carburetors, pistons, piston rings, and engine intake and exhaust valves. Establishments primarily engaged in manufacturing metallic packing are classified in industry 3053, and those primarily engaged in manufacturing machine repair and equipment parts (except electric), on a job or order basis for others, are classified in industry 3599.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 3592, Carburetors, Pistons, Rings, and Valves, had employment of 21.7 thousand. The employment figure was 30 percent below the 31.2 thousand reported in 1982. Compared with 1986, employment decreased 25 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses. The leading States in employment in 1987 were Michigan, Indiana, Kentucky, and Ohio. This represents a shift from 1982 when Michigan, New York, Kentucky, and Indiana were the leading States.

The total value of shipments for establishments classified in this industry was \$2.3 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3592 shipped \$1.7 billion of carburetors, pistons, rings, and valves products considered primary to the industry, \$551.9 million of secondary products, and had \$27.5 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 76 percent (specialization ratio). In 1982, the specialization ratio was 81 percent.

<sup>1</sup>Standard Industrial Classification Manual: 1987. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.



Establishments in this industry also accounted for 84 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 94 percent. The products primary to industry 3592, no matter in what industry they were produced, appear in table 6a and aggregate to \$2.0 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the carburetors, pistons, rings, and valves industry amounted to \$1.1 billion. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 3 percent of total value of shipments.

### **INDUSTRY 3593, FLUID POWER CYLINDERS AND ACTUATORS**

This industry is made up of establishments primarily engaged in manufacturing hydraulic and pneumatic cylinders and actuators for use in fluid power systems. Products of this industry also are collected in the Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace.

Industry 3593, Fluid Power Cylinders and Actuators, was previously included in the statistics for Industry 3599, Machinery, Except Electrical, N.E.C., under the 1972-based SIC. The effect of the revisions on the data is summarized in tables 1c-1 and 1c-2. During the 1987 processing, each establishment was classified according to both the old and new SIC. Table 1c-1 shows the distribution of the new industry among the old SIC classifications. Table 1c-2 shows the distribution of the old SIC-based industries among the new SIC classifications.

In the 1987 Census of Manufactures, Industry 3593, Fluid Power Cylinders and Actuators, had employment of 20.2 thousand. The leading States in employment in 1987 were California, New York, Illinois, and Ohio.

The total value of shipments for establishments classified in this industry was \$1.9 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3593 shipped \$1.5 billion of fluid power cylinder and actuators products considered primary to the industry, \$305.7 million of secondary products, and had \$69.6 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 83 percent (specialization ratio).

Establishments in this industry also accounted for 89 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). The products primary to industry 3593, no matter in what industry they were produced, appear in table 6a and aggregate to \$1.7 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the fluid power cylinders and actuators industry amounted to \$637.5 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 10 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 1 percent of total value of shipments.

### **INDUSTRY 3594, FLUID POWER PUMPS AND MOTORS**

This industry is made up of establishments primarily engaged in manufacturing hydraulic and pneumatic fluid power pumps and motors, including hydrostatic transmissions. Establishments primarily engaged in manufacturing pumps for motor vehicles are classified in industry 3714. Products of this industry also are collected in the Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace.

Industry 3594, Fluid Power Pumps and Motors, was included in the statistics for Industries 3561, Pumps and Pumping Equipment, and 3563, Air and Gas Compressors under the 1972-based SIC. See report MC87-I-35E for statistics on old industries 3561 and 3563.

In the 1987 Census of Manufactures, Industry 3594, Fluid Power Pumps and Motors, had employment of 14.8 thousand. The leading States in employment in 1987 were California, Ohio, Mississippi, and Kansas.

The total value of shipments for establishments classified in this industry was \$1.4 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3594 shipped \$1.1 billion of fluid power pumps and motors products considered primary to the industry, \$218.8 million of secondary products, and had \$44.6 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 84 percent (specialization ratio).

Establishments in this industry also accounted for 78 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio).



The products primary to industry 3594, no matter in what industry they were produced, appear in table 6a and aggregate to \$1.5 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the fluid power pumps and motors industry amounted to \$559.6 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 3 percent of total value of shipments.

### **INDUSTRY 3596, SCALES AND BALANCES, EXCEPT LABORATORY**

This industry is made up of establishments primarily engaged in manufacturing weighing and force-measuring machines and devices of all types, except those regarded as scientific apparatus for laboratory work which are classified in industry 3821.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. However, the industry SIC number has been changed from 3576 to 3596.

In the 1987 Census of Manufactures, Industry 3596, Scales and Balances, Except Laboratory, had employment of 6.7 thousand. The employment figure was 4 percent below the 7.0 thousand reported in 1982. The leading States in employment in 1987 were California, Illinois, Ohio, and Missouri. This represents a shift from 1982 when California, Illinois, Ohio, and Vermont were the leading States.

The total value of shipments for establishments classified in this industry was \$633.0 million.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3596 shipped \$558.9 million of scales and balances, except laboratory products considered primary to the industry, \$10.0 million of secondary products, and had \$64.1 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 98 percent (specialization ratio). In 1982, the specialization ratio also was 98 percent.

Establishments in this industry also accounted for 94 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 86 percent. The products

primary to industry 3596, no matter in what industry they were produced, appear in table 6a and aggregate to \$592.5 million. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the scales and balances, except laboratory, industry amounted to \$273.8 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 6 percent of total value of shipments.

### **INDUSTRY 3599, INDUSTRIAL MACHINERY, N.E.C.**

This industry is made up of establishments primarily engaged in manufacturing machinery and equipment and parts, not elsewhere classified, such as amusement park equipment and flexible metal hose and tubing. This industry also includes establishments primarily engaged in producing or repairing machinery and equipment parts, not elsewhere classified, on a job or order basis for others. Establishments primarily engaged in manufacturing motor vehicle engine filters are classified in industry 3417, and those manufacturing coin-operated amusement machines are classified in industry 3999.

The 1987 definition of this industry has been revised from that used in the 1972 Standard Industrial Classification (SIC) manual. However, the SIC number is unchanged. 1972 SIC-based industry 3599 was split into two separate industries: Fluid Power Cylinders and Actuators (SIC 3593) and Industrial Machinery, N.E.C. (SIC 3599). The effect of the revisions on the data is summarized in tables 1c-1 and 1c-2. During the 1987 processing, each establishment was classified according to both the old and new SIC. Table 1c-1 shows the distribution of the new industry among the old SIC classifications. Table 1c-2 shows the distribution of the old SIC-based industries among the new SIC classifications.

In the 1987 Census of Manufactures, Industry 3599, Industrial Machinery, N.E.C., had employment of 228.4 thousand. The leading States in employment in 1987 were California, Ohio, Michigan, and Pennsylvania, accounting for 36 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$13.7 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3599 shipped \$12.2 billion of machinery and equipment



and parts, n.e.c., products considered primary to the industry, \$468.3 million of secondary products, and had \$998.9 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 96 percent (specialization ratio).

Establishments in this industry also accounted for 96 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). The products primary to industry 3599, no matter in what industry they were produced, appear in table 6a and aggregate to \$12.8 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the industrial machinery, n.e.c., industry amounted to \$4.2 billion. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 10 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 29 percent of total value of shipments.

**Table 1a-1. Historical Statistics for the Industry (1987 Basis): 1987 and Earlier Years**

[Industries with only 1987 data are revised for 1987. Table 1a-2 contains historical data on the old SIC basis. See table 1c-1 for composition of the new industry on the old SIC basis. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year <sup>1</sup>	Companies <sup>2</sup> (no.)	All establishments <sup>3</sup>		All employees		Production workers			Value added by manufac- ture <sup>4</sup> (million dollars)	Cost of materials <sup>5</sup> (million dollars)	Value of shipments (million dollars)	New capital expend- itures <sup>6</sup> (million dollars)	End-of- year inven- tories <sup>4</sup> (million dollars)	Ratios	
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Special- ization <sup>7</sup> (per- cent)	Cover- age <sup>8</sup> (per- cent)
INDUSTRY 3592, CARBURETORS, PISTONS, RINGS, AND VALVES															
1987 Census ---	132	155	86	21.7	648.2	17.3	36.7	485.3	1 198.0	1 088.7	2 287.4	104.9	279.3	76	84
1986 ASM -----	(NA)	(NA)	(NA)	28.8	838.4	22.3	46.3	614.6	1 585.6	1 243.7	2 818.2	244.4	318.0	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	31.6	870.9	24.9	49.8	643.8	1 774.5	1 286.8	3 091.9	188.0	348.7	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	33.4	892.9	26.6	54.3	672.1	1 888.4	1 234.7	3 096.4	96.9	389.0	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	29.8	745.5	23.2	46.7	543.9	1 542.5	928.4	2 485.0	71.1	326.9	(NA)	(NA)
1982 Census ---	149	171	94	31.2	691.9	24.0	46.0	492.4	1 385.1	795.6	2 224.5	106.0	353.5	81	94
1981 ASM -----	(NA)	(NA)	(NA)	32.9	692.8	26.4	50.8	514.8	1 363.9	765.7	2 130.9	137.8	369.7	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	32.5	628.8	25.6	49.3	463.5	1 178.7	673.9	1 838.8	113.9	358.0	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	36.2	661.6	29.4	58.9	504.4	1 295.7	666.7	1 904.1	116.2	343.4	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	33.3	556.5	26.8	53.3	423.5	1 069.4	564.2	1 608.5	120.2	260.5	(NA)	(NA)
1977 Census ---	132	151	84	32.2	508.5	26.0	52.5	388.5	924.9	503.8	1 400.6	79.9	240.0	82	87
1976 ASM -----	(NA)	(NA)	(NA)	31.1	453.2	24.9	49.8	347.2	841.4	444.4	1 256.3	38.6	204.1	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	29.6	374.4	23.6	44.4	272.9	637.9	365.4	1 009.0	30.6	173.3	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	31.9	378.8	25.8	50.8	284.1	625.0	368.5	977.3	29.7	175.3	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	32.5	371.2	26.5	54.0	284.5	669.5	359.6	1 017.6	73.5	152.6	(NA)	(NA)
1972 Census ---	98	113	72	26.7	272.3	21.6	43.5	207.1	500.0	262.3	744.3	27.1	112.4	81	74
INDUSTRY 3593, FLUID POWER CYLINDERS AND ACTUATORS <sup>9</sup>															
1987 Census ---	330	362	168	20.2	602.0	13.2	26.1	333.9	1 254.5	637.5	1 896.6	81.1	399.5	83	89
INDUSTRY 3594, FLUID POWER PUMPS AND MOTORS <sup>9</sup>															
1987 Census ---	133	150	67	14.8	428.9	9.0	18.9	240.2	830.6	559.6	1 404.4	58.5	351.9	84	78
INDUSTRY 3596, SCALES AND BALANCES, EXCEPT LABORATORY <sup>10</sup>															
1987 Census ---	118	134	57	6.7	146.1	3.8	8.0	65.7	355.6	273.8	633.0	11.5	134.0	98	94
1986 ASM -----	(NA)	(NA)	(NA)	6.9	145.7	4.4	9.1	69.9	356.1	252.3	604.2	9.4	121.8	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	6.9	134.4	4.3	9.1	66.4	332.6	231.8	577.3	<sup>11</sup> 9.9	118.8	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	6.9	132.2	4.2	8.4	64.2	324.2	231.2	552.3	11.6	135.9	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	6.7	128.7	4.1	8.1	62.5	319.2	228.1	547.2	<sup>11</sup> 12.6	129.2	(NA)	(NA)
1982 Census ---	113	128	63	7.0	128.3	4.2	8.0	62.2	284.0	222.7	516.4	15.9	122.6	98	86
1981 ASM -----	(NA)	(NA)	(NA)	6.6	109.6	4.1	8.4	60.8	277.1	189.0	467.0	11.9	112.8	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	7.2	109.9	4.6	9.4	63.6	337.4	184.6	514.1	11.4	112.5	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	7.8	106.9	5.1	10.5	61.9	318.8	177.9	487.2	11.2	105.3	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	7.3	95.1	4.9	9.8	53.0	267.6	155.9	417.1	13.0	95.5	(NA)	(NA)
1977 Census ---	92	103	46	7.1	84.5	4.7	9.1	46.9	214.9	138.8	348.1	6.8	85.7	96	99
1976 ASM -----	(NA)	(NA)	(NA)	7.4	87.0	4.7	9.2	44.5	243.1	128.1	368.3	5.6	80.6	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	7.2	77.5	4.4	8.6	41.6	203.4	121.8	323.3	9.5	73.8	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	7.3	74.3	4.7	9.6	43.9	185.8	108.4	292.0	6.7	67.9	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	6.8	66.0	4.3	9.2	37.9	168.2	88.6	246.8	4.7	57.4	(NA)	(NA)
1972 Census ---	86	96	43	6.7	59.3	4.1	8.6	32.5	129.7	74.3	200.4	5.7	47.5	92	95
INDUSTRY 3599, INDUSTRIAL MACHINERY, N.E.C. <sup>9</sup>															
1987 Census ---	21 412	21 545	2 985	228.4	5 118.7	177.5	366.3	3 480.6	9 516.3	4 170.7	13 692.2	539.4	1 855.9	96	96

<sup>1</sup>In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

<sup>2</sup>For the Census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

<sup>3</sup>Includes establishments with payroll at any time during year.

<sup>4</sup>Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

<sup>5</sup>Detailed data on materials consumed by type are shown in table 7.

<sup>6</sup>Detailed data on new machinery and equipment expenditures are provided in table 3c.

<sup>7</sup>Represents ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for establishments classified in the industry.

<sup>8</sup>Represents ratio of primary products shipped by establishments classified in industry to total shipments of such products by all manufacturing establishments, wherever classified.

<sup>9</sup>Industry definition is new for 1987 Census of Manufactures. An explanation of the Standard Industrial Classifications revision appears in the Summary of Findings of this report.

<sup>10</sup>Although there was no change in definition or content, old SIC Industry 3576, Scales and Balances, Except Laboratory, was renumbered to new SIC Industry 3596.

<sup>11</sup>Estimates for new capital expenditures have associated standard errors of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.



Table 1a-2. **Historical Statistics for the Industry (1972 Basis): 1987 and Earlier Years**

[Table 1a-2 contains the historical data on the old SIC basis. See table 1c-1 for composition of the new industry on the old SIC basis. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Companies (no.)	All establishments		All employees		Production workers			Value added by manufac- ture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expendi- tures (million dollars)	End-of- year invent- ories (million dollars)	Ratios	
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Special- ization (per- cent)	Cover- age (per- cent)
INDUSTRY 3599, MACHINERY, EXCEPT ELECTRICAL, N.E.C.															
1987 Census ---	21 706	21 899	3 150	248.5	5 718.4	190.6	392.2	3 813.4	10 765.3	4 805.5	15 580.5	620.1	2 252.1	(NA)	(NA)
1986 ASM -----	(NA)	(NA)	(NA)	244.2	5 439.0	185.1	373.1	3 634.7	10 271.6	4 940.3	15 167.0	572.7	2 090.4	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	252.6	5 316.2	197.4	394.2	3 656.4	9 976.9	4 903.9	14 765.1	701.9	1 941.8	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	249.9	4 913.3	195.1	384.9	3 410.5	9 121.3	4 486.0	13 560.2	559.5	1 432.9	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	247.2	4 618.2	194.7	387.1	3 187.0	8 485.6	3 939.3	12 483.2	543.3	1 509.0	(NA)	(NA)
1982 Census ---	21 913	22 076	3 099	250.9	4 543.4	196.8	390.4	3 201.4	8 421.0	3 820.6	12 272.2	660.7	1 641.6	96	94
1981 ASM -----	(NA)	(NA)	(NA)	267.3	4 653.2	216.2	440.5	3 299.0	8 812.9	4 163.2	12 872.7	754.7	1 596.5	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	269.8	4 198.6	216.7	434.3	2 966.2	7 715.5	3 855.1	11 498.3	711.4	1 391.6	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	250.6	3 602.4	203.3	416.1	2 561.3	6 824.1	3 360.8	9 980.5	690.5	1 288.5	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	214.4	2 932.5	171.7	332.7	2 016.8	5 426.2	2 756.6	8 056.2	517.7	1 021.6	(NA)	(NA)
1977 Census ---	19 136	19 247	2 499	190.5	2 472.2	150.9	298.0	1 716.7	4 439.1	2 234.2	6 612.7	340.7	822.5	96	94
1976 ASM -----	(NA)	(NA)	(NA)	177.9	2 076.3	142.8	283.3	1 477.5	3 894.1	1 798.2	5 674.2	263.5	673.7	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	185.7	2 000.5	149.4	294.2	1 433.6	3 639.4	1 763.9	5 420.2	305.7	647.9	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	190.2	1 936.1	155.8	312.3	1 416.6	3 632.0	1 775.5	5 319.9	215.9	621.2	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	167.9	1 589.8	138.0	272.6	1 158.4	2 933.0	1 361.4	4 235.4	144.2	475.5	(NA)	(NA)
1972 Census ---	16 217	16 287	1 946	157.8	1 424.7	127.2	248.4	1 021.3	2 515.5	1 175.1	3 665.2	122.2	416.2	93	94

Note: For qualifications of data, see footnotes on table 1a-1.

Table 1b-1. **Selected Operating Ratios for the Industry (1987 Basis): 1987 and Earlier Years**

[Industries with only 1987 data are revised for 1987. Table 1b-2 contains historical data on the old SIC basis. See table 1c-1 for composition of the new industry on the old SIC basis. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
<b>INDUSTRY 3592, CARBURETORS, PISTONS, RINGS, AND VALVES</b>									
1987 Census -----	29 871	80	2 121	13.22	48	76	55 207	54	32.64
1986 ASM -----	29 111	77	2 076	13.27	44	74	55 056	53	34.25
1985 ASM -----	27 560	79	2 000	12.93	42	70	56 155	49	35.63
1984 ASM -----	26 733	80	2 041	12.38	40	69	56 539	47	34.78
1983 ASM -----	25 016	78	2 013	11.65	37	67	51 762	48	33.03
1982 Census -----	22 176	77	1 917	10.70	36	67	44 394	50	30.11
1981 ASM -----	21 057	80	1 924	10.13	36	68	41 456	51	26.85
1980 ASM -----	19 347	79	1 926	9.40	37	71	36 268	53	23.91
1979 ASM -----	18 276	81	2 003	8.56	35	70	35 793	51	22.00
1978 ASM -----	16 711	80	1 989	7.95	35	70	32 114	52	20.06
1977 Census -----	15 791	81	2 019	7.40	36	72	28 724	55	17.62
1976 ASM -----	14 572	80	2 000	6.97	35	71	27 055	54	16.90
1975 ASM -----	12 648	80	1 881	6.15	36	73	21 551	59	14.37
1974 ASM -----	11 874	81	1 969	5.59	38	76	19 592	61	12.30
1973 ASM -----	11 421	82	2 038	5.27	35	72	20 600	55	12.40
1972 Census -----	10 198	81	2 014	4.76	35	72	18 727	54	11.49
<b>INDUSTRY 3593, FLUID POWER CYLINDERS AND ACTUATORS</b>									
1987 Census -----	29 802	65	1 977	12.79	34	65	62 104	48	48.07
<b>INDUSTRY 3594, FLUID POWER PUMPS AND MOTORS</b>									
1987 Census -----	28 980	61	2 100	12.71	40	70	56 122	52	43.95
<b>INDUSTRY 3596, SCALES AND BALANCES, EXCEPT LABORATORY</b>									
1987 Census -----	21 806	57	2 105	8.21	43	66	53 075	41	44.45
1986 ASM -----	21 115	64	2 068	7.68	42	66	51 609	41	39.13
1985 ASM -----	19 478	62	2 116	7.30	40	63	48 203	40	36.55
1984 ASM -----	19 159	61	2 000	7.64	42	66	46 986	41	38.60
1983 ASM -----	19 208	61	1 976	7.72	42	65	47 642	40	39.41
1982 Census -----	18 328	60	1 905	7.77	43	68	40 571	45	35.50
1981 ASM -----	16 606	62	2 049	7.24	40	64	41 985	40	32.99
1980 ASM -----	15 263	64	2 043	6.77	36	57	46 861	33	35.89
1979 ASM -----	13 705	65	2 059	5.90	37	58	40 872	34	30.36
1978 ASM -----	13 027	67	2 000	5.41	37	60	36 658	36	27.31
1977 Census -----	11 901	66	1 936	5.15	40	64	30 268	39	23.62
1976 ASM -----	11 756	64	1 957	4.84	35	58	32 851	36	26.42
1975 ASM -----	10 763	61	1 955	4.84	38	62	28 250	38	23.65
1974 ASM -----	10 178	64	2 043	4.57	37	63	25 452	40	19.35
1973 ASM -----	9 705	63	2 140	4.12	36	63	24 735	39	18.28
1972 Census -----	8 850	61	2 098	3.78	37	67	19 358	46	15.08
<b>INDUSTRY 3599, INDUSTRIAL MACHINERY, N.E.C.</b>									
1987 Census -----	22 411	78	2 064	9.50	30	68	41 665	54	25.98

Note: For qualifications of data, see footnotes on table 1a-1.

**Table 1b-2. Selected Operating Ratios for the Industry (1972 Basis): 1987 and Earlier Years**

[Table 1b-2 contains the historical data on the old SIC basis. See table 1c-1 for composition of the new industry on the old SIC basis. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
<b>INDUSTRY 3599, MACHINERY, EXCEPT ELECTRICAL, N.E.C.</b>									
1987 Census.....	23 012	77	2 058	9.72	31	68	43 321	53	27.45
1986 ASM.....	22 272	76	2 016	9.74	33	68	42 062	53	27.53
1985 ASM.....	21 045	78	1 997	9.28	33	69	39 497	53	25.31
1984 ASM.....	19 661	78	1 973	8.66	33	69	36 500	54	23.70
1983 ASM.....	18 682	79	1 988	8.23	32	69	34 327	54	21.92
1982 Census.....	18 108	78	1 984	8.20	31	68	33 563	54	21.57
1981 ASM.....	17 408	81	2 037	7.49	32	68	32 970	53	20.01
1980 ASM.....	15 561	80	2 004	6.83	34	70	28 597	54	17.77
1979 ASM.....	14 375	81	2 047	6.16	34	70	27 231	53	16.40
1978 ASM.....	13 677	80	1 938	6.06	34	71	25 309	54	16.31
1977 Census.....	12 977	79	1 975	5.76	34	71	23 302	56	14.90
1976 ASM.....	11 671	80	1 984	5.22	32	68	21 889	53	13.75
1975 ASM.....	10 772	80	1 969	4.87	33	69	19 598	55	12.37
1974 ASM.....	10 179	82	2 004	4.54	33	70	19 096	53	11.63
1973 ASM.....	9 468	82	1 975	4.25	32	70	17 469	54	10.76
1972 Census.....	9 028	81	1 953	4.11	32	71	15 941	57	10.13

Note: For qualifications of data, see footnotes on table 1a-1.

**Table 1c-1. 1987 Statistics for the Industry Showing the Distribution of 1987 SIC-Based Industries Among 1972 SIC-Based Industries**

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
		Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
New Industry 3593, Fluid Power Cylinders and Actuators.....	362	20.2	602.0	13.2	26.1	333.9	1 254.5	637.5	1 896.6	81.1	399.5
Old Industry 3599, Machinery, Except Electrical, N.E.C.....	354	20.1	599.7	13.1	25.9	332.8	1 249.0	634.8	1 888.4	80.7	396.3
All other.....	8	.1	2.3	.1	.1	1.2	5.5	2.8	8.3	.4	3.2
New Industry 3594, Fluid Power Pumps and Motors ..	150	14.8	428.9	9.0	18.9	240.2	830.6	559.6	1 404.4	58.5	351.9
Old Industry 3561, Pumps and Pumping Equipment ..	123	14.3	417.4	8.7	18.4	234.2	808.6	544.6	1 367.2	57.9	340.0
Old Industry 3563, Air and Gas Compressors .....	5	.1	1.4	(Z)	.1	.8	3.1	3.3	6.4	.3	1.5
All other.....	22	.4	10.2	.2	.4	5.2	19.0	11.7	30.8	.4	10.4
New Industry 3599, Industrial Machinery, N.E.C.....	21 545	228.4	5 118.7	177.5	366.3	3 480.6	9 516.3	4 170.7	13 692.2	539.4	1 855.9
Old Industry 3599, Machinery, Except Electrical, N.E.C.....	21 545	228.4	5 118.7	177.5	366.3	3 480.6	9 516.3	4 170.7	13 692.2	539.4	1 855.9

Note: For qualifications of data, see footnotes on table 1a-1.

**Table 1c-2. 1987 Statistics for the Industry Showing the Distribution of 1972 SIC-Based Industries Among 1987 SIC-Based Industries**

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
		Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
Old Industry 3599, Machinery, Except Electrical, N.E.C.....	21 899	248.5	5 718.4	190.6	392.2	3 813.4	10 765.3	4 805.5	15 580.5	620.1	2 252.1
New Industry 3593, Fluid Power Cylinders and Actuators.....	354	20.1	599.7	13.1	25.9	332.8	1 249.0	634.8	1 888.4	80.7	396.3
New Industry 3599, Industrial Machinery, N.E.C.....	21 545	228.4	5 118.7	177.5	366.3	3 480.6	9 516.3	4 170.7	13 692.2	539.4	1 855.9

Note: For qualifications of data, see footnotes on table 1a-1.



**Table 2. Industry Statistics for Selected States: 1987 and 1982**

[Excludes data for auxiliaries. States with 150 employees or more are shown. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area		1987										1982		
		All establishments		All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees <sup>2</sup> (1,000)	Value added by manufacture (million dollars)
		Total (no.)	With 20 employees or more (no.)	Number <sup>2</sup> (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						
E1														
INDUSTRY 3592, CARBURETORS, PISTONS, RINGS, AND VALVES														
United States -----	-	155	86	21.7	648.2	17.3	36.7	485.3	1 198.0	1 088.7	2 287.4	104.9	31.2	1 385.1
Alabama -----	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
California -----	E2	31	14	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.0	31.1
Colorado -----	-	2	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Florida -----	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Georgia -----	-	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois -----	E8	8	5	.3	5.8	.2	.4	3.9	6.9	7.3	14.4	(D)	1.0	28.6
Indiana -----	-	9	8	2.3	63.7	1.9	4.0	46.6	101.7	63.9	167.1	6.1	2.3	66.0
Iowa -----	-	2	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Kentucky -----	-	5	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Michigan -----	-	13	7	5.8	232.8	4.6	10.5	175.0	353.4	472.4	826.2	40.5	5.5	278.7
Missouri -----	-	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	2.0	52.5
Nebraska -----	-	1	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Nevada -----	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
New York -----	-	7	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
North Carolina -----	-	2	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Ohio -----	-	11	9	1.7	57.2	1.3	2.8	41.0	108.2	71.9	178.6	(D)	EE	(D)
Pennsylvania -----	-	6	3	.5	14.4	.4	.9	11.2	28.7	11.7	40.4	3.2	1.1	42.8
Tennessee -----	-	4	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Texas -----	-	11	5	.7	12.7	.6	1.2	8.3	17.2	21.0	38.1	(D)	.4	13.7
Virginia -----	E1	3	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wisconsin -----	-	5	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
INDUSTRY 3593, FLUID POWER CYLINDERS AND ACTUATORS														
United States -----	-	362	168	20.2	602.0	13.2	26.1	333.9	1 254.5	637.5	1 896.6	81.1	(NA)	(NA)
Alabama -----	-	7	6	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Arizona -----	-	7	1	.2	6.8	.2	.4	5.4	14.1	2.2	15.9	(D)	(NA)	(NA)
California -----	-	62	25	6.9	234.9	4.0	6.9	115.9	521.8	209.9	735.5	34.0	(NA)	(NA)
Florida -----	-	12	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois -----	-	36	17	1.7	44.1	1.0	2.0	21.8	84.2	50.7	139.6	5.3	(NA)	(NA)
Indiana -----	-	11	7	.5	14.5	.3	.8	8.2	37.2	13.4	51.0	(D)	(NA)	(NA)
Iowa -----	-	12	10	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Kansas -----	-	5	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Michigan -----	-	30	12	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Minnesota -----	-	8	5	.4	7.5	.3	.5	5.4	14.1	10.1	24.0	.4	(NA)	(NA)
New Jersey -----	-	7	3	.2	6.1	.1	.2	2.2	11.8	4.6	16.2	.4	(NA)	(NA)
New York -----	-	20	10	3.1	124.6	2.2	4.9	75.3	224.8	89.7	316.8	(D)	(NA)	(NA)
Ohio -----	-	33	23	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Oregon -----	-	9	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Pennsylvania -----	-	8	2	.2	3.9	.1	.3	2.6	8.0	4.6	11.5	(D)	(NA)	(NA)
Texas -----	-	11	4	.4	8.5	.3	.6	5.8	17.6	16.1	33.1	.2	(NA)	(NA)
West Virginia -----	-	4	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wisconsin -----	-	20	12	.8	16.9	.5	1.0	10.1	36.8	25.8	62.5	(D)	(NA)	(NA)
INDUSTRY 3594, FLUID POWER PUMPS AND MOTORS														
United States -----	-	150	67	14.8	428.9	9.0	18.9	240.2	830.6	559.6	1 404.4	58.5	(NA)	(NA)
California -----	-	22	11	2.1	67.5	1.1	2.2	31.1	119.3	106.5	220.3	(D)	(NA)	(NA)
Florida -----	-	6	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois -----	-	11	6	.9	23.4	.6	1.3	13.3	47.4	45.8	94.9	3.6	(NA)	(NA)
Indiana -----	-	5	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Iowa -----	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Kansas -----	-	2	1	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Maine -----	-	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Massachusetts -----	E1	3	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Michigan -----	-	12	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Minnesota -----	-	4	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Mississippi -----	-	2	2	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Missouri -----	-	2	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Nebraska -----	-	3	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New Jersey -----	-	4	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Ohio -----	-	14	7	1.4	40.4	.9	1.8	21.3	92.3	49.0	144.0	(D)	(NA)	(NA)
Oklahoma -----	-	2	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Tennessee -----	-	2	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Washington -----	-	4	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wisconsin -----	-	8	4	1.0	28.7	.5	1.0	13.3	30.9	24.4	54.3	5.3	(NA)	(NA)

See footnotes at end of table.

**Table 2. Industry Statistics for Selected States: 1987 and 1982—Con.**

[Excludes data for auxiliaries. States with 150 employees or more are shown. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1987											1982		
	All establishments		All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees <sup>2</sup> (1,000)	Value added by manufacture (million dollars)	
	E <sup>1</sup>	Total (no.)	With 20 employees or more (no.)	Number <sup>2</sup> (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)							Wages (million dollars)
<b>INDUSTRY 3596, SCALES AND BALANCES, EXCEPT LABORATORY</b>														
United States .....	-	134	57	6.7	146.1	3.8	8.0	65.7	355.6	273.8	633.0	11.5	7.0	284.0
California .....	-	27	14	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.1	39.2
Illinois .....	-	11	6	.9	19.4	.6	1.2	9.7	48.6	39.1	87.2	(D)	1.1	44.7
Minnesota .....	-	5	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Mississippi .....	-	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Missouri .....	-	3	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
New Jersey .....	-	5	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
New York .....	-	6	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Ohio .....	-	11	6	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	39.9
South Carolina .....	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Texas .....	E1	4	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Vermont .....	-	2	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Washington .....	-	7	3	.2	5.8	.1	.2	1.5	12.2	7.3	19.3	(D)	AA	(D)
Wisconsin .....	-	5	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
<b>INDUSTRY 3599, INDUSTRIAL MACHINERY, N.E.C.</b>														
United States .....	E2	21 545	2 985	228.4	5 118.7	177.5	366.3	3 480.6	9 516.3	4 170.7	13 692.2	539.4	(NA)	(NA)
Alabama .....	E3	278	43	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Arizona .....	E2	308	55	3.4	81.2	2.6	5.6	55.8	144.0	51.7	194.6	7.9	(NA)	(NA)
Arkansas .....	E4	138	10	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
California .....	E3	3 705	405	33.4	803.6	25.8	52.9	538.9	1 544.1	576.8	2 118.6	75.9	(NA)	(NA)
Colorado .....	E2	294	31	2.7	58.4	2.2	4.5	39.5	112.2	52.8	164.6	(D)	(NA)	(NA)
Connecticut .....	E3	595	86	6.7	167.7	5.1	10.8	110.4	296.6	127.5	413.0	19.5	(NA)	(NA)
Delaware .....	E2	34	6	.4	8.8	.3	.7	5.8	17.1	6.7	22.4	.8	(NA)	(NA)
Florida .....	E3	533	63	4.5	89.7	3.5	7.2	61.7	167.4	71.4	240.3	9.2	(NA)	(NA)
Georgia .....	E3	336	41	3.5	71.9	2.8	5.7	50.0	133.8	60.5	194.0	5.8	(NA)	(NA)
Idaho .....	E5	52	5	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois .....	E2	1 149	210	14.9	348.7	11.7	24.5	238.4	653.2	286.1	936.3	50.4	(NA)	(NA)
Indiana .....	E3	510	88	6.2	135.9	4.8	9.9	91.2	250.8	106.5	361.2	16.9	(NA)	(NA)
Iowa .....	E2	147	16	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Kansas .....	E2	216	27	2.7	59.1	2.0	4.2	40.9	116.2	49.6	165.6	(D)	(NA)	(NA)
Kentucky .....	E2	198	26	2.3	44.8	1.9	3.8	30.6	83.1	35.3	118.0	4.0	(NA)	(NA)
Louisiana .....	E2	268	33	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Maine .....	E2	75	12	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Maryland .....	E4	200	40	2.6	60.1	1.9	4.1	40.0	118.7	43.6	161.1	(D)	(NA)	(NA)
Massachusetts .....	E2	725	121	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Michigan .....	E1	1 222	213	15.5	361.5	12.1	25.2	243.3	699.5	461.4	1 160.5	(D)	(NA)	(NA)
Minnesota .....	E2	453	90	6.2	150.3	5.0	10.3	105.5	299.9	133.6	425.4	23.0	(NA)	(NA)
Mississippi .....	E2	127	9	1.0	19.2	.7	1.4	11.4	35.1	17.0	51.7	1.5	(NA)	(NA)
Missouri .....	E2	365	45	3.9	86.2	3.1	6.4	59.4	156.2	73.3	228.4	11.4	(NA)	(NA)
Montana .....	E6	48	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Nebraska .....	E2	93	10	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Nevada .....	E4	42	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New Hampshire .....	E3	176	24	1.6	34.0	1.3	2.6	23.4	62.2	23.1	85.4	(D)	(NA)	(NA)
New Jersey .....	E2	744	79	6.9	165.4	5.2	10.8	107.5	311.9	123.0	430.9	13.9	(NA)	(NA)
New Mexico .....	E5	91	12	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New York .....	E3	1 027	157	10.7	235.0	8.4	17.1	160.6	424.8	185.2	616.4	22.5	(NA)	(NA)
North Carolina .....	E3	488	55	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
North Dakota .....	E4	32	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Ohio .....	E2	1 461	227	17.9	386.8	14.1	28.6	267.5	654.4	314.2	1 020.1	39.0	(NA)	(NA)
Oklahoma .....	E3	291	20	2.1	43.7	1.7	3.4	30.4	80.4	32.3	112.7	3.4	(NA)	(NA)
Oregon .....	E2	292	33	2.2	48.3	1.7	3.4	32.3	87.6	34.9	122.1	(D)	(NA)	(NA)
Pennsylvania .....	E2	1 102	207	15.0	321.8	11.7	23.7	221.6	609.4	248.1	852.3	29.4	(NA)	(NA)
Rhode Island .....	E3	107	14	1.1	22.5	.8	1.6	15.0	39.6	14.7	54.1	1.4	(NA)	(NA)
South Carolina .....	E4	226	22	2.0	41.9	1.5	3.3	28.0	72.7	33.0	105.3	4.0	(NA)	(NA)
South Dakota .....	E4	26	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Tennessee .....	E2	293	47	3.4	75.4	2.6	5.6	51.8	130.1	69.9	198.7	(D)	(NA)	(NA)
Texas .....	E3	1 451	147	11.7	257.4	9.1	18.7	178.3	478.2	193.0	670.4	18.9	(NA)	(NA)
Utah .....	E4	133	19	1.3	26.2	1.0	2.1	18.4	45.5	24.1	69.3	(D)	(NA)	(NA)
Vermont .....	E2	41	6	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Virginia .....	E2	301	54	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Washington .....	E3	405	47	3.8	88.0	2.9	6.1	60.8	171.9	67.1	236.7	13.0	(NA)	(NA)
West Virginia .....	E3	107	12	1.2	23.8	.9	1.9	17.2	47.0	22.4	67.2	(D)	(NA)	(NA)
Wisconsin .....	E2	560	103	7.5	159.3	5.9	12.4	109.7	303.3	146.8	447.6	23.2	(NA)	(NA)
Wyoming .....	E3	42	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)

Note: For qualifications of data, see footnotes on table 1a-1.

<sup>1</sup>Payroll and sales data for some small single-unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other Government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown for those States where estimated value of shipments data based on administrative-record data account for 10 percent or more of figure shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

<sup>2</sup>Statistics for some producing States have been withheld to avoid disclosing data for individual companies. However, for States with 150 employees or more, number of establishments is shown and employment-size range is indicated by one of the following symbols: AA—150 to 249 employees; BB—250 to 499 employees; CC—500 to 999 employees; EE—1,000 to 2,499 employees; FF—2,500 employees or more.



**Table 3a. Summary Statistics for the Industry: 1987**

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Carburetors, pistons, rings, and valves (SIC 3592)	Fluid power cylinders and actuators (SIC 3593)	Fluid power pumps and motors (SIC 3594)	Scales and balances, except laboratory (SIC 3596)	Industrial machinery, n.e.c. (SIC 3599)
Companies ----- number .....	132	330	133	118	21 412
All establishments ----- do .....	155	362	150	134	21 545
With 1 to 19 employees ----- do .....	69	194	83	77	18 560
With 20 to 99 employees ----- do .....	44	129	33	36	2 832
With 100 employees or more ----- do .....	42	39	34	21	153
Employment and labor costs:					
Employees ----- 1,000 .....	21.7	20.2	14.8	6.7	228.4
Compensation, total ----- mil dol .....	825.2	736.0	535.4	178.4	6 064.1
Annual payroll ----- do .....	648.2	602.0	428.9	146.1	5 118.7
Fringe benefits ----- do .....	177.0	134.0	106.5	32.2	945.3
Social Security and other legally required payments ----- do .....	58.2	57.7	43.3	12.2	475.6
Employer payments and other programs ----- do .....	118.8	76.3	63.2	20.0	469.8
Production workers:					
Average for year ----- 1,000 .....	17.3	13.2	9.0	3.8	177.5
March ----- do .....	17.8	13.0	8.8	3.9	175.8
May ----- do .....	17.4	13.1	8.8	3.9	176.2
August ----- do .....	17.0	13.0	9.1	3.8	177.1
November ----- do .....	17.0	13.4	9.2	3.7	178.5
Hours ----- millions .....	36.7	26.1	18.9	8.0	366.3
January to March ----- do .....	9.4	6.3	4.6	2.0	91.6
April to June ----- do .....	9.5	6.5	4.7	2.0	91.0
July to September ----- do .....	8.9	6.5	4.7	2.0	91.4
October to December ----- do .....	9.0	6.7	4.8	2.0	92.4
Wages ----- mil dol .....	485.3	333.9	240.2	65.7	3 480.6
Value added by manufacture ----- do .....	1 198.0	1 254.5	830.6	355.6	9 516.3
Cost of materials <sup>1</sup> ----- do .....	1 088.7	637.5	559.6	273.8	4 170.7
Materials, parts, containers, etc., consumed <sup>2</sup> ----- do .....	1 023.7	492.5	500.7	241.1	3 338.9
Resales ----- do .....	11.8	36.1	17.6	22.9	120.2
Fuels ----- do .....	12.5	4.4	3.7	1.0	49.3
Purchased electricity ----- do .....	33.1	21.7	18.4	4.0	149.7
Contract work ----- do .....	7.6	82.8	19.3	4.9	512.7
Quantity of electric energy used for heat and power:					
Purchased ----- mil kWh .....	638.8	343.9	362.2	60.4	2 848.5
Generated less sold ----- do .....	(D)	-	-	-	(S)
Total value of shipments ----- mil dol .....	2 287.4	1 896.6	1 404.4	633.0	13 692.2
Primary products ----- do .....	1 708.1	1 521.3	1 141.0	558.9	12 225.0
Secondary products ----- do .....	551.9	305.7	218.8	10.0	468.3
Miscellaneous receipts, total ----- do .....	27.5	69.6	44.6	64.1	998.9
Value of resales ----- do .....	14.5	39.9	25.9	38.3	158.7
Contract receipts ----- do .....	2.8	11.6	(D)	2.3	631.2
Sales of scrap and refuse ----- do .....	(X)	.6	(D)	(X)	11.1
Receipts for installation or construction of products of this establishment ----- do .....	(X)	.3	(D)	(X)	20.8
Receipts for research and developmental work ----- do .....	(X)	(D)	(X)	(X)	11.7
Receipts for repair work ----- do .....	(X)	13.1	2.4	(D)	50.5
Other miscellaneous receipts ----- do .....	(X)	.7	(D)	2.0	35.2
Miscellaneous receipts, n.s.k. ----- do .....	10.1	(D)	(D)	(D)	79.7
Inventories by stage of fabrication:					
Beginning of 1987 ----- mil dol .....	275.5	392.6	356.9	138.7	1 896.9
Finished goods ----- do .....	89.5	51.7	107.0	32.9	305.4
Work in process ----- do .....	118.9	248.4	174.4	59.5	1 117.8
Materials and supplies ----- do .....	67.1	92.5	75.4	46.3	473.8
End of 1987 ----- do .....	279.3	399.5	351.9	134.0	1 855.9
Finished goods ----- do .....	88.3	50.4	94.5	32.0	294.7
Work in process ----- do .....	119.4	245.1	172.7	56.8	1 123.4
Materials and supplies ----- do .....	71.6	104.0	84.7	45.1	437.8
Primary product specialization ratio ----- percent .....	76	83	84	98	96
Coverage ratio ----- do .....	84	89	78	94	96

Note: For qualifications of data, see footnotes on table 1a-1.

<sup>1</sup>Data on purchased services for the repair of buildings and machinery and for communication services are not included in cost of materials, etc., but are shown in table 3c.

<sup>2</sup>Data on materials consumed by type are shown in table 7. Data on amount purchased or transferred from foreign sources are shown in table 3c.

**Table 3b. Gross Book Value of Depreciable Assets, Capital Expenditures, Retirements, Depreciation, and Rental Payments: 1987**

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Carburetors, pistons, rings, and valves (SIC 3592)	Fluid power cylinders and actuators (SIC 3593)	Fluid power pumps and motors (SIC 3594)	Scales and balances, except laboratory (SIC 3596)	Industrial machinery, n.e.c. (SIC 3599)
Gross book value of depreciable assets:					
Total:					
Beginning of year .....	1 128.7	688.6	575.0	133.1	5 704.6
New capital expenditures <sup>1</sup> .....	104.9	81.1	58.5	11.5	539.4
Used capital expenditures .....	5.5	9.5	2.9	.5	112.5
Retirements .....	56.0	21.1	13.0	13.1	112.9
End of year .....	1 183.0	758.0	623.5	132.0	6 243.6
Buildings and other structures:					
Beginning of year .....	178.7	159.5	125.5	48.6	862.1
New capital expenditures .....	9.1	12.8	8.5	1.5	72.6
Used capital expenditures .....	.4	2.2	.9	.2	33.0
Retirements .....	3.0	.2	2.8	2.7	7.1
End of year .....	185.2	174.3	132.1	47.6	960.6
Machinery and equipment:					
Beginning of year .....	950.0	529.0	449.5	84.5	4 842.4
New capital expenditures <sup>1</sup> .....	95.7	68.3	50.0	10.0	466.8
Used capital expenditures .....	5.1	7.2	2.0	.3	79.5
Retirements .....	53.0	20.9	10.2	10.4	105.8
End of year .....	997.9	583.7	491.4	84.4	5 283.0
Depreciation charges during 1987:					
Total .....	101.8	56.9	48.9	12.8	558.7
Buildings and other structures .....	9.4	8.2	4.4	2.5	50.7
Machinery and equipment .....	92.4	48.7	44.5	10.3	508.0
Rental payments:					
Total .....	6.4	16.7	11.5	5.0	247.3
Buildings and other structures .....	2.8	7.3	4.0	2.7	109.4
Machinery and equipment .....	3.6	9.3	7.5	2.3	137.9

Note: Retirements and depreciation data for establishments not included in the ASM sample were extrapolated from the historical ratio of retirements or depreciation to assets. These ratios were developed at the industry level.

<sup>1</sup>Data on new machinery and equipment expenditures by type are provided in table 3c.

**Table 3c. Supplemental Industry Statistics Based on Sample Estimates: 1987**

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Carburetors, pistons, rings, and valves (SIC 3592)		Fluid power cylinders and actuators (SIC 3593)		Fluid power pumps and motors (SIC 3594)		Scales and balances, except laboratory (SIC 3596)		Industrial machinery, n.e.c. (SIC 3599)	
	Amount (million dollars)	Relative standard error of estimate <sup>1</sup> (percent)	Amount (million dollars)	Relative standard error of estimate <sup>1</sup> (percent)	Amount (million dollars)	Relative standard error of estimate <sup>1</sup> (percent)	Amount (million dollars)	Relative standard error of estimate <sup>1</sup> (percent)	Amount (million dollars)	Relative standard error of estimate <sup>1</sup> (percent)
Purchased services:										
Cost of purchased services for the repair of-										
Buildings and other structures .....	2.7	(X)	6.7	(X)	3.7	(X)	.6	(X)	(S)	(X)
Response coverage ratio (percent) <sup>2</sup> .....	76.8	(X)	87.1	(X)	86.5	(X)	73.1	(X)	(S)	(X)
Machinery .....	13.5	(X)	13.1	(X)	11.1	(X)	1.1	(X)	(S)	(X)
Response coverage ratio (percent) <sup>2</sup> .....	76.8	(X)	87.8	(X)	86.5	(X)	73.1	(X)	(S)	(X)
Cost of purchased communication services .....	3.6	(X)	7.6	(X)	3.6	(X)	1.7	(X)	(S)	(X)
Response coverage ratio (percent) <sup>2</sup> .....	76.8	(X)	86.5	(X)	86.5	(X)	73.1	(X)	(S)	(X)
New machinery and equipment expenditures .....	95.7	(X)	68.3	(X)	50.0	(X)	10.0	(X)	466.8	(X)
Automobiles, trucks, etc., for highway use .....	.8	15	2.1	34	.4	56	.6	23	142.9	24
Computers and peripheral data processing equipment .....	6.4	1	11.9	12	5.2	3	1.9	13	21.4	25
All other .....	88.5	1	54.3	3	44.4	1	7.5	5	302.5	4
Adjustment ratio <sup>3</sup> .....	1.2	(X)	1.4	(X)	1.1	(X)	1.3	(X)	1.3	(X)
Cost of materials, components, parts, etc., used .....	1 023.7	(X)	492.5	(X)	500.7	(X)	241.1	(X)	3 338.9	(X)
Materials purchased or transferred from foreign sources <sup>4</sup> .....	204.4	1	9.1	18	26.2	19	15.2	17	37.5	16
Materials purchased or transferred from domestic sources .....	819.3	1	483.4	1	474.5	1	225.8	2	3 301.4	1
Adjustment ratio <sup>3</sup> .....	1.3	(X)	1.2	(X)	1.1	(X)	1.4	(X)	1.9	(X)

<sup>1</sup>For description of relative standard error of estimate, see Qualifications of the Data in appendixes.

<sup>2</sup>Measure of extent to which respondents reported each item. Derived for each item by calculating the ratio of weighted employment for those sample establishments that reported the specific inquiry to total employment for all establishments classified in industry. (See appendixes for explanation of sample weight.)

<sup>3</sup>Detail has been adjusted upwards to account for nonresponse. Inverse of the ratio shown represents a measure of the response to the inquiry. (See appendixes for further explanation.)

<sup>4</sup>Data may understate the true cost of imported parts, components, and supplies since some respondents do not know the origin of these materials. Includes cases where materials were purchased from secondary suppliers or where they were transferred from company-operated warehouses or other distribution points. Direct purchases from foreign suppliers and importers by domestic manufacturing establishments are believed to be reported accurately.



Table 4. Industry Statistics by Employment Size of Establishment: 1987

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and employment size class	E <sup>1</sup>	All establishments (no.)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 3592, CARBURETORS, PISTONS, RINGS, AND VALVES												
Total -----	-	155	21.7	648.2	17.3	36.7	485.3	1 198.0	1 088.7	2 287.4	104.9	279.3
Establishments with an average of—												
1 to 4 employees -----	E9	27	.1	.9	(Z)	.1	.6	1.6	1.4	3.0	.3	.5
5 to 9 employees -----	E9	19	.1	2.6	.1	.2	1.9	4.6	4.2	8.8	.7	1.6
10 to 19 employees -----	E5	23	.3	5.8	.2	.5	3.7	11.3	8.3	19.7	1.4	2.8
20 to 49 employees -----	E3	31	.9	20.7	.7	1.5	13.1	42.4	34.3	76.7	3.0	12.7
50 to 99 employees -----	E1	13	1.0	23.0	.8	1.5	15.3	40.5	26.5	65.5	3.0	14.6
100 to 249 employees -----	-	18	3.3	91.8	2.5	5.3	68.5	204.1	141.8	354.0	14.8	53.1
250 to 499 employees -----	-	13	4.5	108.4	3.7	7.5	81.8	175.1	159.5	330.1	10.2	68.9
500 to 999 employees -----	-	6	3.8	103.6	2.9	6.2	75.3	247.4	215.2	460.3	29.1	47.4
1,000 to 2,499 employees -----	-	4	7.7	291.3	6.4	14.0	225.2	470.9	497.5	969.4	42.4	77.6
2,500 employees or more -----	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records <sup>2</sup> -----	E9	64	.5	9.1	.4	.8	6.6	16.3	14.3	30.6	2.8	5.0
INDUSTRY 3593, FLUID POWER CYLINDERS AND ACTUATORS												
Total -----	-	362	20.2	602.0	13.2	26.1	333.9	1 254.5	637.5	1 896.6	81.1	399.5
Establishments with an average of—												
1 to 4 employees -----	E5	36	.1	2.0	.1	.1	1.3	4.4	2.0	6.4	.3	.9
5 to 9 employees -----	E1	61	.4	8.8	.3	.7	5.7	16.1	9.3	25.5	1.1	3.0
10 to 19 employees -----	-	97	1.3	29.1	.9	1.8	17.3	55.6	28.1	82.2	3.6	13.3
20 to 49 employees -----	-	94	2.7	64.0	2.0	4.1	38.4	134.7	84.2	219.9	9.5	39.8
50 to 99 employees -----	-	35	2.6	68.2	1.7	3.5	39.2	142.9	77.9	219.1	5.2	59.8
100 to 249 employees -----	-	32	4.7	116.0	3.2	6.9	72.4	236.6	175.6	414.9	13.3	121.3
250 to 499 employees -----	-	3	8.4	314.1	5.0	9.0	159.6	664.1	260.4	928.6	48.0	161.5
500 to 999 employees -----	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
1,000 to 2,499 employees -----	-	2	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
2,500 employees or more -----	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records <sup>2</sup> -----	E9	47	.3	4.7	.2	.4	2.8	10.1	4.6	14.7	.6	4.2
INDUSTRY 3594, FLUID POWER PUMPS AND MOTORS												
Total -----	-	150	14.8	428.9	9.0	18.9	240.2	830.6	559.6	1 404.4	58.5	351.9
Establishments with an average of—												
1 to 4 employees -----	E8	26	.1	1.1	(Z)	.1	.6	2.8	2.2	5.0	.1	1.3
5 to 9 employees -----	E3	28	.2	3.9	.1	.2	2.2	10.6	8.3	18.8	.3	4.8
10 to 19 employees -----	E6	29	.4	9.1	.3	.5	5.4	19.0	12.3	31.3	1.0	7.1
20 to 49 employees -----	E2	22	.7	15.4	.4	.8	8.5	39.9	27.7	66.8	2.1	16.3
50 to 99 employees -----	E1	11	.8	18.9	.6	1.1	10.1	48.5	28.3	76.9	1.2	17.6
100 to 249 employees -----	-	13	2.3	64.0	1.4	2.9	32.2	125.1	112.4	237.5	8.3	68.3
250 to 499 employees -----	-	16	5.6	169.7	3.2	6.7	92.9	305.1	189.7	514.3	25.4	122.1
500 to 999 employees -----	-	3	4.6	146.8	3.0	6.5	88.3	279.6	178.7	453.8	20.1	114.4
1,000 to 2,499 employees -----	-	2	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records <sup>2</sup> -----	E9	59	.6	10.8	.3	.6	5.3	25.2	19.4	44.6	1.0	11.9
INDUSTRY 3596, SCALES AND BALANCES, EXCEPT LABORATORY												
Total -----	-	134	6.7	146.1	3.8	8.0	65.7	355.6	273.8	633.0	11.5	134.0
Establishments with an average of—												
1 to 4 employees -----	E8	28	.1	1.3	(Z)	.1	.7	3.3	2.1	5.5	.1	1.2
5 to 9 employees -----	E9	18	.1	2.3	.1	.1	1.2	6.0	3.3	9.3	.2	2.4
10 to 19 employees -----	E5	31	.4	9.3	.2	.5	4.2	22.3	12.8	35.3	1.4	8.1
20 to 49 employees -----	-	20	.7	15.0	.4	.8	6.3	35.2	24.3	58.4	.8	13.1
50 to 99 employees -----	-	16	1.2	26.6	.6	1.2	10.0	57.1	51.4	108.7	2.1	17.6
100 to 249 employees -----	-	16	2.5	59.1	1.4	2.9	25.4	147.9	106.8	259.2	3.8	57.1
250 to 999 employees -----	-	5	1.8	32.5	1.1	2.4	17.8	83.6	73.1	156.5	3.0	34.4
Covered by administrative records <sup>2</sup> -----	E9	59	.4	7.0	.2	.4	3.6	18.7	10.3	29.0	.7	7.4
INDUSTRY 3599, INDUSTRIAL MACHINERY, N.E.C.												
Total -----	E2	21 545	228.4	5 118.7	177.5	366.3	3 480.6	9 516.3	4 170.7	13 692.2	539.4	1 855.9
Establishments with an average of—												
1 to 4 employees -----	E8	9 980	19.1	346.9	15.6	30.0	249.3	687.1	267.5	954.5	28.4	137.4
5 to 9 employees -----	E4	4 830	32.3	620.9	25.3	52.2	430.9	1 180.6	459.9	1 640.1	57.5	215.2
10 to 19 employees -----	E2	3 750	50.7	1 092.1	39.0	79.4	717.9	1 993.0	808.8	2 800.7	123.7	347.2
20 to 49 employees -----	E2	2 322	68.0	1 613.9	52.9	109.8	1 103.9	2 935.3	1 193.0	4 158.9	163.3	544.4
50 to 99 employees -----	E2	510	33.6	837.9	26.0	55.3	570.3	1 552.0	659.8	2 203.5	92.8	338.4
100 to 249 employees -----	E1	137	19.4	476.4	14.8	31.1	325.3	906.3	546.7	1 447.9	60.9	205.0
250 to 499 employees -----	E1	15	5.2	130.6	3.8	8.5	82.9	262.0	235.1	486.5	12.9	68.4
500 to 999 employees -----	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records <sup>2</sup> -----	E9	11 486	33.5	518.5	27.0	53.3	373.2	1 015.9	401.0	1 417.0	41.4	205.6

See footnotes at end of table.

**Table 4. Industry Statistics by Employment Size of Establishment: 1987—Con.**

Note: For qualifications of data, see footnotes on table 1a-1. Data shown as a (D) are included in underscored figures above.

<sup>1</sup>Payroll and sales data for some small single unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other Government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown for those employment-size classes where estimated data based on administrative-record data account for 10 percent or more of figures shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

<sup>2</sup>Report forms were not mailed to small single unit companies with up to 20 employees (cutoff varied by industry). Payroll and sales data for 1987 were obtained from administrative records supplied by other agencies of the Federal Government. Those data were then used in conjunction with industry averages to estimate the items shown. Data are also included in respective employment-size classes shown.

**Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1987**

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry or product class code	Industry or primary product class	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
3592	<b>Carburetors, pistons, rings, and valves:</b> All establishments in industry -----	155	21.7	648.2	17.3	36.7	485.3	1 198.0	1 088.7	2 287.4	104.9
	Establishments with this product class primary:										
35921	Carburetors, new and rebuilt -----	24	8.4	274.6	6.8	14.3	211.8	491.8	628.0	1 125.8	47.3
35922	Pistons, piston rings, and piston pins (engine) -----	41	8.7	234.0	8.9	14.9	170.0	404.5	235.4	639.7	32.2
35923	Valves (engine intake and exhaust) -----	12	3.7	121.3	2.8	6.1	90.0	269.6	197.3	462.6	20.3
3593	<b>Fluid power cylinders and actuators:</b> All establishments in industry -----	362	20.2	602.0	13.2	26.1	333.9	1 254.5	637.5	1 896.6	81.1
	Establishments with this product class primary:										
35931	Hydraulic and pneumatic cylinders and related items, except aerospace -----	190	9.0	217.6	6.0	12.4	125.5	452.8	300.5	757.7	24.3
35932	Aerospace type hydraulic and pneumatic cylinders and related items -----	46	8.9	327.2	5.6	10.4	174.3	692.3	265.9	959.9	50.2
35933	Parts for hydraulic and pneumatic cylinders, and related items -----	62	1.8	47.8	1.2	2.6	28.0	91.5	61.8	152.1	4.9
3594	<b>Fluid power pumps and motors:</b> All establishments in industry -----	150	14.8	428.9	9.0	18.9	240.2	830.6	559.6	1 404.4	58.5
	Establishments with this product class primary:										
35941	Fluid power pumps, motors, and hydrostatic transmission components -----	63	11.8	354.2	7.2	15.3	199.5	708.3	482.2	1 201.2	49.9
35942	Parts and attachments for fluid power pumps, motors, and hydrostatic transmissions -----	24	2.1	59.1	1.3	2.6	32.5	87.6	53.0	144.1	7.4
3596	<b>Scales and balances, except laboratory:</b> All establishments in industry -----	134	6.7	146.1	3.8	8.0	65.7	355.6	273.8	633.0	11.5
	Establishments with this product class primary:										
35961	Vehicle and industrial scales -----	37	2.8	67.0	1.4	2.9	23.7	146.2	106.8	255.4	4.6
35962	Retail, commercial, household, and mailing scales -----	17	2.8	55.4	1.8	3.8	30.5	145.4	121.3	268.2	4.8
35963	Parts, attachments, and accessories for scales and balances -----	10	.5	11.9	.3	.7	5.8	32.0	28.1	59.6	1.0
3599	<b>Industrial machinery, n.e.c.:</b> All establishments in industry -----	21 545	228.4	5 118.7	177.5	366.3	3 480.6	9 516.3	4 170.7	13 692.2	539.4
	Establishments with this product class primary:										
35994	Miscellaneous machinery products -----	1 221	26.4	617.3	19.9	41.3	389.6	1 146.4	726.1	1 871.6	87.1
35995	Receipts for machine shop job work (machining of material owned by others) -----	4 558	108.0	2 674.7	83.1	174.3	1 809.0	4 871.7	2 054.7	6 942.1	300.8

Note: For qualifications of data, see footnotes on table 1a-1.

**Table 5b. Industry-Product Analysis—Value of Shipments and Primary Product Shipments and Specialization and Coverage Ratios for the Industry: 1987 and Earlier Census Years**

[An establishment is assigned to an industry based on shipment values of products representing largest amount considered primary to an industry. Frequently, establishment shipments comprise mixtures of products assigned to an industry (primary), those considered primary to other industries (secondary), and receipts for activities such as merchandising or contract work. Columns A-D show this product pattern for an industry, and column E shows primary product specialization ratio. The extent to which an industry's primary products are shipped by establishments classified in and out of an industry is shown in columns F-H and coverage ratio is shown in column I. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and product group code	Industry and census year	Value of shipments					Value of primary product shipments			
		Total (million dollars)	Primary products (million dollars)	Secondary products (million dollars)	Miscellaneous receipts (million dollars)	Primary product specialization ratio col. B ÷ col. B+C (percent)	Total made in all industries (million dollars)	Made in this industry (million dollars)	Made in other industries (million dollars)	Coverage ratio col. B ÷ col. F (percent)
		A	B	C	D	E	F	G	H	I
3592	Carburetors, pistons, rings, and valves ----- 1987--	2 287.4	1 708.1	551.9	27.5	76	2 038.3	1 708.1	330.2	84
	----- 1982--	2 224.5	1 790.9	407.0	26.6	81	1 908.1	1 790.9	117.2	94
	----- 1977--	1 400.6	1 128.7	243.4	28.5	82	1 298.5	1 128.7	169.8	87
3593	Fluid power cylinders and actuators ----- 1987--	1 896.6	1 521.3	305.7	69.6	83	1 706.4	1 521.3	185.1	89
3594	Fluid power pumps and motors ----- 1987--	1 404.4	1 141.0	218.8	44.6	84	1 458.7	1 141.0	317.7	78

See footnotes at end of table.



**Table 5b. Industry-Product Analysis—Value of Shipments and Primary Product Shipments and Specialization and Coverage Ratios for the Industry: 1987 and Earlier Census Years—Con.**

[An establishment is assigned to an industry based on shipment values of products representing largest amount considered primary to an industry. Frequently, establishment shipments comprise mixtures of products assigned to an industry (primary), those considered primary to other industries (secondary), and receipts for activities such as merchandising or contract work. Columns A-D show this product pattern for an industry, and column E shows primary product specialization ratio. The extent to which an industry's primary products are shipped by establishments classified in and out of an industry is shown in columns F-H and coverage ratio is shown in column I. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and product group code	Industry and census year	Value of shipments					Value of primary product shipments				
		Total (million dollars)	Primary products (million dollars)	Secondary products (million dollars)	Miscellaneous receipts (million dollars)	Primary product specialization ratio col. B ÷ col. B + C (percent)	Total made in all industries (million dollars)	Made in this industry (million dollars)	Made in other industries (million dollars)	Coverage ratio col. B ÷ col. F (percent)	
		A	B	C	D	E	F	G	H	I	
3596	Scales and balances, except laboratory -----	1987..	633.0	558.9	10.0	64.1	98	592.5	558.9	33.7	94
		1982..	497.7	466.6	8.3	22.8	98	545.2	466.6	78.6	86
		1977..	348.1	325.6	12.5	10.0	96	328.9	325.6	3.3	99
3599	Industrial and commercial machinery and equipment, n.e.c. -----	1987..	13 692.2	12 225.0	468.3	998.9	96	12 780.6	12 225.0	555.7	96

**Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982**

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	Year	Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>		Shipments for replacement including shipments to U.S. motor vehicle manufacturers for resale		Shipments to U.S. motor vehicle manufacturers or their suppliers for use in original equipment (million dollars)	Shipments for export, including transfers to other divisions for export (million dollars)
				Quantity <sup>2</sup>	Value (million dollars)	Quantity	Value (million dollars)		
3592- --	<b>CARBURETORS, PISTONS, RINGS, AND VALVES</b>								
	<b>Total .....</b>	1987	(NA)	(X)	2 038.3	(X)	(X)	(X)	(X)
		1982	(NA)	(X)	1 908.1	(X)	(X)	(X)	(X)
35921 --	Carburetors, new and rebuilt .....	1987	(NA)	(X)	926.7	(X)	(X)	(X)	(X)
		1982	(NA)	(X)	1 028.7	(X)	(X)	(X)	(X)
35921 01	Carburetors (new), all types: For motor vehicle engines (passenger car, truck, and bus) .....	1987	6	**7.8	544.6	1.4	91.0	(D)	(D)
		1982	10	14.5	893.8	1.9	72.4	745.3	76.1
35921 02	All other carburetors .....	1987	7	(S)	90.8	(X)	(X)	(X)	(X)
		1982	8	2.8	41.7	(X)	(X)	(X)	(X)
35921 03	Carburetors, rebuilt, all types .....	1987	21	(S)	107.2	(X)	(X)	(X)	(X)
		1982	10	1.3	34.0	(X)	(X)	(X)	(X)
35921 05	Parts for carburetors (excluding gaskets and screw machine products) .....	1987	6	(X)	183.3	(X)	(X)	(X)	(X)
		1982	25	(X)	57.5	(X)	(X)	(X)	(X)
35921 00	Carburetors, n.s.k. ....	1987	(NA)	(X)	.8	(X)	(X)	(X)	(X)
		1982	(NA)	(X)	1.7	(X)	(X)	(X)	(X)
35922 --	<b>Pistons, piston rings, and piston pins (engine).....</b>	1987	(NA)	(X)	650.8	(X)	(X)	(X)	(X)
		1982	(NA)	(X)	494.2	(X)	(X)	(X)	(X)
35922 01	Pistons, all types (machined), excluding rough castings: For motor vehicle engines (passenger car, truck, and bus) .....	1987	18	40.1	315.2	23.4	157.6	132.6	25.0
		1982	14	12.6	107.7	7.1	52.5	6.7	48.5
35922 02	All other pistons .....	1987	16	(S)	55.5	(X)	(X)	(X)	(X)
		1982	13	10.8	115.4	(X)	(X)	(X)	(X)
35922 03	Piston rings, all types, and piston pins: Oil type: For motor vehicle engines (passenger car, truck, and bus) .....	1987	9	(S)	92.2	(S)	19.6	66.1	6.5
		1982	7	191.2	72.2	76.7	22.8	43.2	6.2

See footnotes at end of table.

**Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.**

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	Year	Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>		Shipments for replacement including shipments to U.S. motor vehicle manufactures for resale		Shipments to U.S. motor vehicle manufacturers or their suppliers for use in original equipment (million dollars)	Shipments for export, including transfers to other divisions for export (million dollars)
				Quantity <sup>2</sup>	Value (million dollars)	Quantity	Value (million dollars)		
<b>3592--</b>	<b>CARBURETORS, PISTONS, RINGS, AND VALVES—Con.</b>								
35922 --	Pistons, piston rings, and piston pins (engine)—Con.								
35922 04	Piston rings, all types, and piston pins—Con. Oil type—Con. All other oil type piston rings ----- millions--	1987 1982	10 6	(S) 22.7	8.2 10.9	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35922 05	Compression type: For motor vehicle engines (passenger car, truck, and bus) ----- millions--	1987 1982	6 7	(S) 361.1	121.4 132.8	(S) (D)	51.6 (D)	(D) (D)	(D) 6.5
35922 06	All other compression type piston rings ----- do--	1987 1982	12 7	(S) 1.9	32.4 25.2	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35922 09	Piston pins -----	1987 1982	3 3	(X) (X)	( <sup>3</sup> ) ( <sup>3</sup> )	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35922 00	Pistons, piston rings, and piston pins, n.s.k.-----	1987 1982	(NA) (NA)	(X) (X)	<sup>3</sup> 25.9 <sup>3</sup> 30.0	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35923 --	Valves (engine intake and exhaust) -----	1987 1982	(NA) (NA)	(X) (X)	403.1 325.1	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35923 01	For motor vehicle engines (passenger car, truck, and bus) ----- millions--	1987 1982	9 6	(S) (D)	377.6 249.5	(S) (D)	27.8 (D)	317.8 (D)	32.0 (D)
35923 02	For other engines ----- do--	1987 1982	7 13	(S) (S)	21.4 72.7	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35923 00	Valves, n.s.k. -----	1987 1982	(NA) (NA)	(X) (X)	4.2 2.9	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35920 --	Carburetors, pistons, rings, and valves, n.s.k. -----	1987 1982	(NA) (NA)	(X) (X)	57.7 60.1	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35920 00	Carburetors, pistons, rings, and valves, n.s.k., typically for establishments with 20 employees or more (see note) -----	1987 1982	(NA) (NA)	(X) (X)	27.3 35.9	(X) (X)	(X) (X)	(X) (X)	(X) (X)
35920 02	Carburetors, pistons, rings, and valves, n.s.k., typically for establishments with less than 20 employees (see note) -----	1987 1982	(NA) (NA)	(X) (X)	30.4 24.2	(X) (X)	(X) (X)	(X) (X)	(X) (X)
1987 product code	Product	1987				1982			
			Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>		Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>		
				Quantity <sup>2</sup>	Value (million dollars)		Quantity <sup>2</sup>	Value (million dollars)	
<b>3593--</b>	<b>FLUID POWER CYLINDERS AND ACTUATORS</b>								
	<b>Total -----</b>		(NA)	(X)	<sup>4</sup> 1 706.4	(NA)	(X)		( <sup>4</sup> )
35931 -- 35931 00	Hydraulic and pneumatic cylinders and related items: Hydraulic and pneumatic cylinders and related items, except aerospace (for additional detail, see Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace)-----		223	(X)	726.5	213	(X)		<sup>6</sup> 640.8
35932 -- 35932 00	Aerospace type hydraulic and pneumatic cylinders and related items: Aerospace type hydraulic and pneumatic cylinders and related items (for additional detail, see Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace)-----		87	(X)	669.5	84	(X)		<sup>6</sup> 310.1
35933 -- 35933 00	Parts for hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and nonvehicular shock absorbers: Parts for hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and nonvehicular shock absorbers (for additional detail, see Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace)-----		144	(X)	293.6	78	(X)		<sup>7</sup> 144.9
35930 -- 35930 00	Fluid power cylinders and actuators, n.s.k.----- Fluid power cylinders and actuators, n.e.c., typically for establishments with 10 employees or more (see note) -----		(NA) (NA)	(X) (X)	16.8 2.3	(NA) (NA)	(X) (X)		( <sup>4</sup> ) ( <sup>4</sup> )
35930 02	Fluid power cylinders and actuators, n.s.k., typically for establishments with less than 10 employees (see note) -----		(NA)	(X)	14.5	(NA)	(X)		( <sup>4</sup> )

See footnotes at end of table.



**Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.**

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>		Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>	
			Quantity <sup>2</sup>	Value (million dollars)		Quantity <sup>2</sup>	Value (million dollars)
<b>3594--</b>	<b>FLUID POWER PUMPS AND MOTORS</b>						
	Total .....	(NA)	(X)	<sup>8</sup> 1 458.7	(NA)	(X)	<sup>(8)</sup>
35941 --	Fluid power pumps, motors, and hydrostatic transmission components (including the valve of the driver if shipped as a complete unit) .....	(NA)	(X)	1 082.6	(NA)	(X)	<sup>(8)</sup>
35941 10	Hydraulic fluid power pumps, motors, and hydrostatic transmission components (including the value of the driver if shipped as a complete unit) (for additional detail, see Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace) .....	105	(X)	1 082.6	98	(X)	9729.8
35941 20	Pneumatic air motors (including the value of the driver if shipped as a complete unit) (for additional detail, see Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace) .....	5			(NA)	(X)	<sup>(8)</sup>
35941 00	Fluid power pumps, motors, and hydrostatic transmission components (including the value of the driver if shipped as a complete unit), n.s.k. ....	(NA)	(X)	-	(NA)	(X)	<sup>(8)</sup>
35942 --	Parts and attachments for fluid power pumps, motors, and hydrostatic transmissions .....	(NA)	(X)	316.4	(NA)	(X)	<sup>(8)</sup>
35942 10	Parts and attachments for hydraulic fluid power pumps, motors, and hydrostatic transmissions (for additional detail, see Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace) .....	69	(X)	311.8	45	(X)	<sup>10</sup> 322.4
35942 20	Parts for pneumatic air motors (for additional detail, see Current Industrial Report MA-35N, Fluid Power Products, Including Aerospace) .....	7	(X)	4.5	(NA)	(X)	<sup>(8)</sup>
35942 00	Parts and attachments for fluid power pumps, motors, and hydrostatic transmissions, n.s.k. ....	(NA)	(X)	.1	(NA)	(X)	<sup>(8)</sup>
35940 --	Fluid power pumps and motors, n.s.k. ....	(NA)	(X)	59.7	(NA)	(X)	<sup>(8)</sup>
35940 00	Fluid power pumps and motors, n.s.k., typically for establishments with 20 employees or more (see note) .....	(NA)	(X)	15.3	(NA)	(X)	<sup>(8)</sup>
35940 02	Fluid power pumps and motors, n.s.k., typically for establishments with less than 20 employees (see note) .....	(NA)	(X)	44.4	(NA)	(X)	<sup>(8)</sup>
<b>3596--</b>	<b>SCALES AND BALANCES, EXCEPT LABORATORY</b>						
	Total .....	(NA)	(X)	<sup>11</sup> 592.5	(NA)	(X)	<sup>11</sup> 545.2
35961 --	Vehicle and industrial scales .....	(NA)	(X)	250.3	(NA)	(X)	<sup>12</sup> 207.2
35961 01	Motor truck scales .....	12	(S)	34.4	13	<sup>**</sup> 4.0	35.2
35961 03	Railroad track scales .....	5	(S)	4.3	8	(S)	5.6
	Industrial scales:						
35961 05	Bench and portable .....	10	(S)	40.2	14	(S)	24.0
35961 07	Floor scales, dormant, pitless .....	11	(S)	18.0	15	<sup>*</sup> 6.9	22.8
35961 09	Automatic checkweigher .....	4	(S)		4	<sup>.</sup> 9	14.1
35961 11	Bulkweigher .....	6	(S)	33.2	9	(S)	16.4
35961 13	Over-under (predetermined weight) .....	7	(S)	13.0	3	(S)	4.5
35961 15	Miscellaneous industrial scales, including special purpose, crane, suspension, tank, hopper, force measuring devices, and conveyor scales (weigh and feed) for bulk materials .....	21	(S)	96.1	29	(S)	72.4
35961 17	Counting scales .....	6	11.5	9.7	6	(S)	12.2
35961 00	Vehicle and industrial scales, n.s.k. ....	(NA)	(X)	1.4	(NA)	(X)	-
35962 --	Retail, commercial, household, and mailing scales .....	(NA)	(X)	192.9	(NA)	(X)	<sup>12</sup> 223.2
	Retail and commercial scales:						
35962 01	Delicatessen .....	5	(S)	15.6	6	<sup>**</sup> 12.8	12.7
35962 03	Checkstand .....	4	(S)	7.9	3	(D)	<sup>(13)</sup>
35962 05	Automatic prepack .....	3	(S)	6.5	3	(S)	<sup>13</sup> 35.6
35962 07	Other .....	8	(S)	<sup>14</sup> 25.7	10	<sup>15</sup> 1 821.5	<sup>15</sup> 23.7
	Household and person-weighing scales:						
35962 09	Bathroom .....	3			6	<sup>*</sup> 6 481.2	50.4
35962 11	Person-weighing scales (coin-operated and free weighing) and miscellaneous household scales (including kitchen, baby scales, etc.) .....	6	(S)	80.6	6	(S)	23.6
	Mailing and parcel post scales:						
35962 13	Handheld .....	1					
35962 15	Other .....	5	(S)	56.6	10	(S)	77.2
	Other balances with or without weights:						
35962 17	Sensitivity of 5 cg or better .....	1	(X)	<sup>(14)</sup>	(NA)	(X)	<sup>(15)</sup>
35962 19	Sensitivity of less than 5 cg .....	1	(X)	<sup>(14)</sup>	(NA)	(X)	<sup>(15)</sup>
35962 00	Retail, commercial, household, and mailing scales, n.s.k. ....	(NA)	(X)	-	(NA)	(X)	-
35963 --	Parts, attachments, and accessories for scales and balances .....	(NA)	(X)	95.7	(NA)	(X)	<sup>12</sup> 84.9
	Accessories and attachments (sold separately):						
35963 01	Printers .....	9	(S)	10.7	9	16.6	16.1
35963 03	Digital indicators .....	9	(S)	27.0	7	<sup>**</sup> 9.5	10.8
35963 05	Other .....	10	(X)	20.9	9	(X)	9.6
35963 09	Parts for scales and balances (sold for assembly elsewhere, repair, service, etc.) .....	19	(X)	36.7	24	(X)	48.4
35963 00	Parts, attachments, and accessories for scales and balances, n.s.k. ....	(NA)	(X)	.4	(NA)	(X)	-
35960 --	Scales and balances, except laboratory, n.s.k. ....	(NA)	(X)	53.6	(NA)	(X)	<sup>12</sup> 29.8
35960 00	Scales and balances, n.s.k., typically for establishments with 20 employees or more (see note) .....	(NA)	(X)	24.8	(NA)	(X)	15.5
35960 02	Scales and balances, n.s.k., typically for establishments with less than 20 employees (see note) .....	(NA)	(X)	28.8	(NA)	(X)	14.3

See footnotes at end of table.

**Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.**

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>		Number of companies with shipments of \$100,000 or more	Product shipments <sup>1</sup>	
			Quantity <sup>2</sup>	Value (million dollars)		Quantity <sup>2</sup>	Value (million dollars)
<b>3599- --</b>	<b>INDUSTRIAL MACHINERY N.E.C.</b>						
	Total -----	(NA)	(X)	<sup>16</sup> 12 780.6	(NA)	(X)	<sup>17</sup> 10 602.0
35994 --	Miscellaneous machinery products, including flexible metal hose and tubing, metal bellows, etc. -----	(NA)	(X)	1 800.9	(NA)	(X)	1 582.4
35994 11	Flexible metal hose and tubing: -----						
35994 13	Copper and copper-base alloy -----	29	(X)	42.4	25	(X)	26.2
35994 15	Aluminum and aluminum-base alloy -----	77	(X)	54.7	48	(X)	19.8
35994 16	Stainless steel -----	85	(X)	103.7	76	(X)	79.2
35994 25	Other -----	80	(X)	76.5	56	(X)	59.7
35994 31	Metal bellows -----	30	(X)	92.8	24	(X)	88.6
35994 98	Carnival and amusement park equipment (ferris wheels, merry-go-rounds, etc.), excluding coin-operated amusement machines -----	13	(X)	32.7	21	(X)	26.0
35994 00	All other miscellaneous machinery products (weather vanes; swage blocks; leak detectors; propellers, ship and boat, machined; etc.) -----	1 277	(X)	1 346.6	1 475	(X)	1 216.0
35995 --	Miscellaneous machinery products, n.s.k. -----	(NA)	(X)	51.5	(NA)	(X)	66.9
35995 00	Receipts for machine shop job work: -----	5 146	(X)	6 699.9	5 334	(X)	5 594.5
35990 --	Industrial and commercial machinery, n.e.c., n.s.k. -----	(NA)	(X)	4 279.8	(NA)	(X)	<sup>173</sup> 425.1
35990 00	Industrial and commercial machinery, n.e.c., n.s.k., typically for establishments with 10 employees or more (see note) -----	(NA)	(X)	2 855.7	(NA)	(X)	<sup>172</sup> 088.0
35990 02	Industrial and commercial machinery, n.e.c., n.s.k., typically for establishments with less than 10 employees (see note) -----	(NA)	(X)	1 424.1	(NA)	(X)	<sup>171</sup> 337.1

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

<sup>1</sup>Data reported by all producers not just those with shipments of \$100,000 or more.

<sup>2</sup>For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: \* 10 to 19 percent estimated; \*\* 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

<sup>3</sup>For 1987 and 1982, data for product code 35922 09 have been combined with product code 35922 00 to avoid disclosing data for individual companies.

<sup>4</sup>SIC Industry 3593, Fluid Power Cylinders and Actuators, is published as a separate industry for the first time in 1987. Data were included in old SIC Industry 3599, Machinery, Except Electrical, N.E.C., in 1982 and are not available separately.

<sup>5</sup>In 1982, data for product code 35931 00 were published under old SIC product codes 35996 00 and 35997 00.

<sup>6</sup>In 1982, data for product code 35932 00 were published under old SIC product code 35998 00.

<sup>7</sup>In 1982, data for product code 35933 00 were published under old SIC product code 35999 00.

<sup>8</sup>SIC Industry 3594, Fluid Power Pumps and Motors, is published as a separate industry for the first time in 1987. Data were included in old SIC Industries 3561, Pumps and Pumping Equipment, and 3563, Air and Gas Compressors, in 1982 and are not available separately.

<sup>9</sup>In 1982, data for product code 35941 10 were published under old product codes 35617 00 and 35618 00.

<sup>10</sup>In 1982, data for product codes 35942 10 were published under old product codes 3561A 00 and 3561B 00.

<sup>11</sup>In the 1987 SIC revisions, SIC Industry 3596 was renumbered from the old SIC Industry 3576, Scales and Balances, Except Laboratory.

<sup>12</sup>In 1982, data for product codes 35961 --, 35962 --, 35963 --, and 35960 -- were published under old SIC product code 35760 --.

<sup>13</sup>For 1982, data for product code 35962 03 have been combined with product code 35962 05 to avoid disclosing data for individual companies.

<sup>14</sup>For 1987, product codes 35962 17 and 35962 19 were combined with product code 35962 07 to avoid disclosing data for individual companies.

<sup>15</sup>For 1982, product codes 35962 17 and 35962 19 were not collected separately but were included with product code 35962 07.

<sup>16</sup>In the 1987 SIC revisions, old SIC Industry 3599, Machinery, Except Electrical, N.E.C., was split into new SIC Industries 3593, Fluid Power Cylinders and Actuators, and 3599, Industrial Machinery, N.E.C.

<sup>17</sup>Data include an insignificant amount of fluid power cylinders and actuators and may not be directly comparable to 1987 data.



**Table 6a-2. Related Products From Current Industrial Reports Series—Value of Shipments by All Producers: 1987 and 1982**

[Additional detail is provided in the Current Industrial Report series. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987 product shipments		1982 product shipments	
		Quantity	Value (million dollars)	Quantity	Value (million dollars)
	<b>MA35N, FLUID POWER PRODUCTS</b>				
35931 --	Nonaerospace hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and nonvehicular shock absorbers-----thousands..	13 483.3	793.6	7 056.6	609.5
	Hydraulic and pneumatic cylinders and related items -----do..	12 633.9	704.9	6 486.0	521.6
	Hydraulic cylinders:				
	Tie-rod types:				
35931 09	Standard NFPA and JIC tie-rod types-----thousands..	346.6	88.6	539.3	106.2
35931 10	Other tie-rod types, including ASAE-----do..	306.2	28.9		
35931 12	Weld fused-----do..	1 364.8	176.6	684.1	88.9
35931 13	Telescoping-----do..	57.2	46.2	39.7	24.7
35931 14	Threaded-----do..	846.5	140.4	305.4	57.2
35931 15	Mill type-----do..	24.1	17.6	7.9	11.4
35931 16	Other, including combinations-----do..	126.2	16.7	319.6	84.1
	Pneumatic cylinders:				
35931 21	Tie-rod types-----thousands..	865.3	95.5	715.1	84.4
35931 22	Other-----do..	8 697.1	94.3	3 874.9	64.7
	Hydraulic and pneumatic actuators, accumulators, cushions, and nonvehicular shock absorbers-----thousands..	849.4	88.7	570.6	87.9
	Hydraulic and pneumatic rotary actuators, limited rotation:				
35931 25	Hydraulic rotary actuators-----thousands..	34.8	26.1	24.2	20.6
35931 26	Pneumatic rotary actuators-----do..	41.9	10.3	39.5	9.8
35931 31	Accumulators (fluid power), including hydraulic, hydropneumatic, pneumatic, etc.-----do..	65.7	23.2	86.2	33.3
35931 33	Cushions (fluid power), nonlinear, including hydraulic, hydropneumatic, pneumatic, etc.-----do..	707.0	29.1	420.7	24.2
35931 37	Shock absorbers, not for vehicle suspension, hydraulic and pneumatic-----do..				
35932 --	Aerospace type hydraulic and pneumatic cylinders, and related items-----thousands..	(X)	637.3	(X)	291.1
	Hydraulic servo-actuator assemblies (linear and rotary):				
35932 51	Mechanical input-----thousands..	11.6	66.5	37.4	225.8
35932 52	Electrical input-----do..	15.7	62.5		
35932 55	Combination input-----do..	56.0	357.5		
	Hydraulic utility actuators:				
35932 61	Linear actuators (cylinders)-----thousands..	20.2	39.0	21.7	35.8
35932 62	Rotary actuators (limited rotation)-----do..				
35932 71	Shock absorbers, snubbers, and cushions, all types, excluding oleo strut assemblies-----do..	160.2	14.9	108.3	12.8
35932 72	Pneumatic actuators and actuator assemblies (linear and rotary)-----do..	53.2	49.1	11.7	16.7
35932 73	Accumulators and other hydraulic, pneumatic, or combination devices for fluid energy absorption and/or storage-----do..	28.3	21.4		
35932 74	Hydraulic fluid reservoirs and reservoir assemblies, including bootstrap reservoirs, spring pressurized reservoirs, and similar reservoirs; and reservoirs with integral valves and/or filters-----do..	2.7	8.9		
35932 79	Other aerospace type fluid power cylinders, actuators, accumulators, cushions, and related items, n.e.c.-----do..	(X)	17.5		
35933 --	Parts for hydraulic and pneumatic cylinders, actuators, accumulators, cushions; and nonvehicular shock absorbers-----thousands..	(X)	288.7	(X)	116.1
35933 96	Parts for nonaerospace hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and nonvehicular shock absorbers, sold separately-----do..	(X)	175.8	(X)	86.3
35933 98	Parts for aerospace type fluid power (hydraulic and pneumatic) cylinders, actuators, accumulators, cushions, and related items sold separately-----do..	(X)	112.9	(X)	29.8
35941 --	Fluid power pumps, motors, and hydrostatic transmission components (including the valve of the driver if shipped as a complete unit)-----thousands..	(X)	1 052.0	(X)	699.4
	Nonaerospace:				
	Pumps, variable displacement closed loop hydrostatic transmission type:				
35941 13	Vane type-----thousands..	71.2	10.7	29.3	5.7
35941 14	Radial piston type-----do..				
35941 15	Axial piston type-----do..	177.0	75.6	114.2	67.7
	Pumps, variable displacement, open loop only:				
35941 20	Vane type-----thousands..	54.1	23.2	25.1	8.7
35941 26	Radial piston type-----do..				
35941 27	Axial piston type-----do..	142.8	52.2	84.0	39.4
	Pumps, fixed displacement, open and closed loop:				
35941 30	Internal gear type (including gerotor)-----thousands..	857.4	97.2	485.0	59.9
35941 34	External gear type-----do..	1 448.1	96.3	1 394.3	84.7
35941 35	Vane type-----do..	356.1	57.0	184.8	40.6
35941 36	Radial piston type-----do..	39.0	16.7		
35941 37	Axial piston type-----do..	156.3	61.5	98.1	40.0
35941 39	Other pump and pump packages, n.e.c., except vehicle type-----do..	687.9	130.5	258.1	53.7
	Hydraulic and pneumatic motors (continuous rotation):				
	Shipped separately:				
35941 40	Pneumatic (air) motors-----thousands..	1143.0	116.4	(X)	142.2
	Hydraulic motors:				
35941 41	Gear type, internal and external, including gerotor-----thousands..	795.4	111.9	454.9	52.5
35941 42	Vane type, fixed and variable-----do..	9.3	6.1	36.6	16.0
35941 43	Radial piston type, fixed and variable-----do..	74.3	25.3	34.3	20.7
	Axial piston type:				
35941 44	Fixed displacement-----thousands..	165.6	39.5	120.5	39.4
35941 45	Variable displacement-----do..			19.6	16.6
35941 46	Motor types, n.e.c.-----do..	28.4	14.3	1.1	.7
35941 50	Value of drivers shipped with pumps (value only)-----do..	(X)	18.1	(X)	12.9

See footnotes at end of table.

**Table 6a-2. Related Products From Current Industrial Reports Series—Value of Shipments by All Producers: 1987 and 1982—Con.**

[Additional detail is provided in the Current Industrial Report series. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987 product shipments		1982 product shipments	
		Quantity	Value (million dollars)	Quantity	Value (million dollars)
	<b>MA35N, FLUID POWER PRODUCTS—Con.</b>				
35941 --	Fluid power pumps, motors, and hydrostatic transmission components (including the valve of the driver if shipped as a complete unit)—Con.				
	Aerospace:				
	Hydraulic pumps:				
35941 71	Fixed and variable displacement types .....thousands..	61.6	102.6	32.5	60.0
35941 72	Pump/electric motor assemblies, fixed, and variable displacement types .....do..	5.1	39.2		
35941 73	Other pump packages, n.e.c. ....do..	2.2	10.4		
	Motors:				
35941 83	Pneumatic (air) motors and motor packages .....thousands..	( <sup>1</sup> )	( <sup>1</sup> )	(X)	( <sup>1</sup> )
35941 86	Hydraulic motors, fixed and variable displacement types .....do..	9.5	47.3	7.2	18.7
35941 87	Hydraulic motor packages, including motor/gearbox, motor/valve, motor/generator, and similar combination units .....do..				
35942 --	Parts and attachments for fluid power pumps, motors, and hydrostatic transmissions .....	(X)	340.4	(X)	(NA)
	Hydraulic:				
35942 91	Nonaerospace .....	(X)	270.7	(X)	199.3
35942 93	Aerospace .....	(X)	69.7	(X)	84.8
	Pneumatic:				
35942 95	Nonaerospace .....	(X)	-	(X)	(NA)
35942 97	Aerospace .....	(X)	-	(X)	(NA)

<sup>1</sup>Data for product codes 35941 40 and 35941 83 are combined to avoid disclosing data for individual companies.

**Table 6b. Product Classes—Value of Shipments by All Producers for Specified States: 1987 and 1982**

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1987. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

Product class and geographic area	1987 value of product shipments	1982 value of product shipments	Product class and geographic area	1987 value of product shipments	1982 value of product shipments
<b>35921, CARBURETORS, NEW AND REBUILT</b>			<b>35932, AEROSPACE TYPE HYDRAULIC AND PNEUMATIC CYLINDERS AND RELATED ITEMS</b>		
United States .....	926.7	1 028.7	United States .....	669.5	310.1
California .....	50.3	14.7	Arizona .....	8.5	2.2
			California .....	402.4	193.0
			New York .....	239.9	82.7
<b>35922, PISTONS, PISTON RINGS, AND PISTON PINS (ENGINE)</b>					
United States .....	650.8	494.2	<b>35933, PARTS FOR HYDRAULIC AND PNEUMATIC CYLINDERS, AND RELATED ITEMS</b>		
California .....	5.4	7.3	United States .....	293.6	144.9
Indiana .....	144.1	(NA)	California .....	101.0	39.0
Michigan .....	107.0	106.1	Illinois .....	33.8	20.2
Ohio .....	45.7	30.9	Indiana .....	15.8	3.2
Texas .....	7.4	6.9	Iowa .....	2.9	3.1
			Michigan .....	24.6	11.6
<b>35931, HYDRAULIC AND PNEUMATIC CYLINDERS AND RELATED ITEMS, EXCEPT AEROSPACE</b>					
United States .....	726.5	640.8	Minnesota .....	3.7	(NA)
Alabama .....	15.5	(NA)	New York .....	32.3	(NA)
California .....	42.4	51.8	Ohio .....	18.5	11.8
Florida .....	6.0	(NA)	Texas .....	4.3	(NA)
Illinois .....	140.2	(NA)	Wisconsin .....	23.0	5.6
Indiana .....	37.2	(NA)			
Iowa .....	51.9	(NA)	<b>35941, FLUID POWER PUMPS, MOTORS, AND HYDROSTATIC TRANSMISSION COMPONENTS</b>		
Kansas .....	29.5	(NA)	United States .....	1 082.6	(NA)
Michigan .....	60.1	61.9	California .....	121.2	(NA)
Minnesota .....	27.0	(NA)	Florida .....	53.1	(NA)
Mississippi .....	7.6	(NA)	Illinois .....	76.8	(NA)
Nebraska .....	13.0	(NA)	Iowa .....	93.9	(NA)
New Jersey .....	14.1	(NA)	Michigan .....	89.4	(NA)
New York .....	23.7	18.8	Minnesota .....	88.5	(NA)
Ohio .....	107.8	88.0	Ohio .....	77.9	(NA)
Oregon .....	22.8	(NA)	Texas .....	6.2	(NA)
Pennsylvania .....	9.6	(NA)	Wisconsin .....	27.4	(NA)
Tennessee .....	5.6	(NA)			
Texas .....	28.6	(NA)			
West Virginia .....	4.3	(NA)			
Wisconsin .....	37.3	(NA)			



**Table 6b. Product Classes—Value of Shipments by All Producers for Specified States: 1987 and 1982—Con.**

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1987. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

Product class and geographic area	1987 value of product shipments	1982 value of product shipments	Product class and geographic area	1987 value of product shipments	1982 value of product shipments
<b>35942, PARTS AND ATTACHMENTS FOR FLUID POWER PUMPS, MOTORS, AND HYDROSTATIC TRANSMISSIONS</b>			<b>35994, MISCELLANEOUS MACHINERY PRODUCTS—Con.</b>		
United States .....	316.4	(NA)	Ohio .....	133.2	81.7
California .....	36.6	(NA)	Oklahoma .....	10.1	24.0
Illinois .....	47.5	(NA)	Oregon .....	15.7	7.6
Michigan .....	6.9	(NA)	Pennsylvania .....	109.5	95.9
Ohio .....	30.0	(NA)	Rhode Island .....	4.1	15.6
Texas .....	2.6	(NA)	South Carolina .....	13.1	9.6
West Virginia .....	3.3	(NA)	Tennessee .....	64.5	35.3
Wisconsin .....	11.6	(NA)	Texas .....	62.9	151.1
			Utah .....	9.8	2.9
			Virginia .....	18.9	16.9
			Washington .....	41.5	10.4
			Wisconsin .....	79.0	58.0
<b>35961, VEHICLE AND INDUSTRIAL SCALES</b>			<b>35995, RECEIPTS FOR MACHINE SHOP JOB WORK</b>		
United States .....	250.3	207.2	United States .....	6 699.9	5 594.5
California .....	37.5	(NA)	Alabama .....	66.6	91.9
Illinois .....	8.0	(NA)	Arizona .....	113.5	78.2
Washington .....	15.7	(NA)	Arkansas .....	11.7	15.2
<b>35962, RETAIL, COMMERCIAL, HOUSEHOLD, AND MAILING SCALES</b>			California .....	1 024.7	804.7
United States .....	192.9	223.2	Colorado .....	71.2	60.0
California .....	45.6	(NA)	Connecticut .....	221.4	185.4
Illinois .....	57.2	(NA)	Delaware .....	7.4	5.1
<b>35963, PARTS, ATTACHMENTS, AND ACCESSORIES FOR SCALES AND BALANCES</b>			Florida .....	93.0	55.9
United States .....	95.7	84.9	Georgia .....	92.3	62.3
California .....	20.0	(NA)	Idaho .....	2.3	(NA)
Illinois .....	4.9	(NA)	Illinois .....	427.3	337.6
<b>35994, MISCELLANEOUS MACHINERY PRODUCTS</b>			Indiana .....	161.4	114.9
United States .....	1 800.9	1 582.4	Iowa .....	39.3	20.5
Alabama .....	34.7	28.4	Kansas .....	72.5	51.7
Arizona .....	9.3	6.4	Kentucky .....	39.8	30.6
Arkansas .....	10.7	(NA)	Louisiana .....	62.9	145.4
California .....	182.6	247.0	Maine .....	23.0	13.5
Colorado .....	38.3	12.1	Maryland .....	88.0	76.3
Connecticut .....	42.4	68.6	Massachusetts .....	286.4	239.0
Florida .....	43.8	27.8	Michigan .....	610.9	353.7
Georgia .....	17.3	15.6	Minnesota .....	279.8	224.9
Illinois .....	144.5	144.0	Mississippi .....	16.6	18.4
Indiana .....	54.9	48.3	Missouri .....	129.5	104.0
Iowa .....	11.3	5.6	Montana .....	5.2	3.2
Kansas .....	30.5	13.2	Nebraska .....	7.3	7.3
Kentucky .....	21.5	20.4	Nevada .....	4.9	3.3
Louisiana .....	9.1	11.8	New Hampshire .....	28.8	18.9
Maryland .....	15.2	11.7	New Jersey .....	226.6	177.1
Massachusetts .....	93.5	74.4	New Mexico .....	16.6	18.0
Michigan .....	208.9	104.1	New York .....	279.8	228.0
Minnesota .....	44.3	42.3	North Carolina .....	87.2	76.6
Mississippi .....	12.9	3.1	North Dakota .....	6.4	5.3
Missouri .....	17.1	14.3	Ohio .....	534.4	397.8
Nebraska .....	7.6	2.4	Oklahoma .....	39.6	102.4
New Hampshire .....	6.5	6.5	Oregon .....	70.4	56.3
New Jersey .....	55.1	46.4	Pennsylvania .....	489.9	401.5
New York .....	78.8	73.8	Rhode Island .....	20.5	12.4
North Carolina .....	23.9	17.1	South Carolina .....	46.1	25.1
			South Dakota .....	4.1	(NA)
			Tennessee .....	77.1	52.4
			Texas .....	270.7	492.1
			Utah .....	23.6	19.1
			Vermont .....	12.9	11.9
			Virginia .....	96.4	83.4
			Washington .....	110.4	82.8
			West Virginia .....	37.1	55.5
			Wisconsin .....	253.2	151.9
			Wyoming .....	3.2	12.0

**Table 6c. Historical Statistics for Product Classes—Value Shipped by All Producers: 1987 and Earlier Years**

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

1987 product code	Product class	1987	1986 <sup>1</sup>	1985 <sup>1</sup>	1984 <sup>1</sup>	1983 <sup>1</sup>	1982	1977	1972
3592-	<b>Carburetors, pistons, rings, and valves</b> .....	<b>2 038.3</b>	<b>2 291.7</b>	<b>2 562.3</b>	<b>2 564.7</b>	<b>2 179.8</b>	<b>1 908.1</b>	<b>1 298.5</b>	<b>793.9</b>
35921	Carburetors, new and rebuilt .....	926.7	1 378.7	1 581.5	1 514.8	1 349.4	1 028.7	642.0	355.3
35922	Pistons, piston rings, and piston pins (engine) .....	650.8	627.8	701.8	701.8	525.8	494.2	372.2	229.3
35923	Valves (engine intake and exhaust) .....	403.1	251.4	249.0	261.2	241.5	325.1	257.5	196.6
35920	Carburetors, pistons, rings, and valves, n.s.k. ....	57.7	33.7	59.0	87.0	63.1	60.1	26.9	12.7
3593-	<b>Fluid power cylinders and actuators</b> .....	<b>1 706.4</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>
35931	Hydraulic and pneumatic cylinders and related items, except aerospace .....	726.5	661.9	619.4	616.5	585.9	640.8	(NA)	(NA)
35932	Aerospace type hydraulic and pneumatic cylinders and related items .....	669.5	519.9	432.6	331.7	351.8	310.1	456.1	189.2
35933	Parts for hydraulic and pneumatic cylinders, and related items .....	293.6	168.8	150.6	136.4	112.8	144.9	456.1	189.2
35930	Fluid power cylinders and actuators, n.s.k. ....	16.8	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
3594-	<b>Fluid power pumps and motors</b> .....	<b>1 458.7</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>	<b>(NA)</b>
35941	Fluid power pumps, motors, and hydrostatic transmission components .....	1 082.6	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
35942	Parts and attachments for fluid power pumps, motors, and hydrostatic transmissions .....	316.4	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
35940	Fluid power pumps and motors, n.s.k. ....	59.7	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
3596-	<b>Scales and balances, except laboratory</b> .....	<b>592.5</b>	<b>538.8</b>	<b>546.1</b>	<b>557.7</b>	<b>585.2</b>	<b>545.2</b>	<b>328.9</b>	<b>182.1</b>
35961	Vehicle and industrial scales .....	250.3	538.8	546.1	557.7	585.2	207.2	159.1	83.6
35962	Retail, commercial, household, and mailing scales .....	192.9					223.3	108.9	67.3
35963	Parts, attachments, and accessories for scales and balances .....	95.7					84.9	44.4	18.3
35960	Scales and balances, except laboratory, n.s.k. ....	53.6					29.8	16.5	12.9
3599-	<b>Industrial and commercial machinery, n.e.c.</b> .....	<b>12 780.6</b>	<b><sup>2</sup>12 856.7</b>	<b><sup>2</sup>12 413.1</b>	<b><sup>2</sup>11 787.7</b>	<b><sup>2</sup>10 696.7</b>	<b><sup>2</sup>10 602.0</b>	<b><sup>2</sup>5 984.9</b>	<b><sup>2</sup>3 174.1</b>
35994	Miscellaneous machinery products .....	1 800.9	1 562.0	1 624.0	1 814.2	1 659.2	1 582.4	676.9	442.5
35995	Receipts for machine shop job work .....	6 699.9	8 035.1	7 688.3	6 673.3	5 434.2	5 594.5	3 338.1	1 425.8
35990	Industrial and commercial machinery, n.e.c., n.s.k. ....	4 279.8	<sup>2</sup> 3 259.6	<sup>2</sup> 3 100.8	<sup>2</sup> 3 300.2	<sup>2</sup> 3 603.3	<sup>2</sup> 3 425.1	<sup>2</sup> 1 969.9	<sup>2</sup> 1 305.8

<sup>1</sup>Figures are estimates derived from a representative sample of manufacturing establishments. Standard errors associated with estimates are published in annual survey of manufactures publications for this period.

<sup>2</sup>Data include an insignificant amount of fluid power cylinders and actuators (SIC 3593) and may not be directly comparable to 1987 data.

**Table 7. Materials Consumed by Kind: 1987 and 1982**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity <sup>1</sup>	Delivered cost (million dollars)	Quantity <sup>1</sup>	Delivered cost (million dollars)
	<b>INDUSTRY 3592, CARBURETORS, PISTONS, RINGS, AND VALVES</b>				
	<b>Materials, parts, containers, and supplies</b> .....	<b>(X)</b>	<b>1 023.7</b>	<b>(X)</b>	<b>718.7</b>
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes .....	(S)	16.7	24.8	18.3
331012	Sheet and strip .....	(S)	50.4	29.7	14.6
331006	All other carbon steel mill shapes and forms .....	(S)	50.4	(S)	7.8
331020	Alloy steel, except stainless .....	(S)	40.1	(S)	16.5
331031	Stainless steel .....	(D)	(D)	11.1	24.2
335004	Copper and copper-base alloy .....	(D)	(D)	(S)	9.6
	Aluminum and aluminum-base alloy:				
335405	Extruded shapes, including rod, bar, pipe, tube, etc. ....	(S)	29.6	25.9	14.1
335011	All other .....	(S)	2.9	(D)	11.0
335609	Nonferrous metal, except copper and aluminum .....	(S)	2.9	(S)	1.7
	Castings (rough and semifinished):				
332001	Iron (gray and malleable) and steel castings .....	(S)	39.7	(S)	38.0
336005	Aluminum and aluminum-base alloy .....	(S)	202.7	<sup>2</sup> 29.4	37.2
336003	Other nonferrous .....	(D)	(D)	(S)	23.7
345001	Bolts, nuts, screws, rivets, and screw machine products .....	(X)	64.6	(X)	32.0
354501	Cutting tools for machine tools .....	(X)	(D)	(X)	6.9
306902	Fabricated rubber products, except tires, tubes, hose, belting, and gaskets .....	(X)	23.3	(X)	20.5
308004	Fabricated plastics products, except hose, belting, and gaskets .....	(X)	11.3	(X)	8.5
329321	Gaskets .....	(X)	(D)	(X)	( <sup>3</sup> )
280020	Ceramic raw materials, including powders, chemicals, and fibers, excluding refractory uses .....	(X)	(D)	(X)	( <sup>3</sup> )
320601	Ceramic and ceramic composite parts, components, and accessories .....	(X)	(D)	(X)	( <sup>3</sup> )
970099	All other materials and components, parts, containers, and supplies .....	(X)	396.0	(X)	<sup>3</sup> 381.1
971000	Materials, parts, containers, supplies, n.s.k. <sup>2</sup> .....	(X)	70.8	(X)	53.0

See footnotes at end of table.



Table 7. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity <sup>1</sup>	Delivered cost (million dollars)	Quantity <sup>1</sup>	Delivered cost (million dollars)
	<b>INDUSTRY 3593, FLUID POWER CYLINDERS AND ACTUATORS</b>				
	Materials, parts, containers, and supplies -----	(X)	492.5	(NA)	( <sup>4</sup> )
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons..	(S)	59.4	(NA)	(NA)
331012	Sheet and strip ----- do..	(S)	3.1	(NA)	(NA)
331013	Plates ----- do..	(S)	5.3	(NA)	(NA)
331015	Structural shapes ----- do..	(S)	6.2	(NA)	(NA)
331017	Wire and wire products ----- do..	(S)	.8	(NA)	(NA)
331019	All other carbon steel mill shapes and forms ----- do..	(S)	43.7	(NA)	(NA)
	Alloy steel, except stainless:				
331021	Bars and bar shapes ----- 1,000 s tons..	(S)	9.2	(NA)	(NA)
331029	All other alloy steel mill shapes and forms ----- do..	3.7	7.4	(NA)	(NA)
	Stainless steel:				
331033	Sheet and strip ----- 1,000 s tons..	(S)	1.3	(NA)	(NA)
331050	All other stainless steel mill shapes and forms ----- do..	(S)	20.4	(NA)	(NA)
	Copper and copper-base alloy:				
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes ----- mil lb..	(S)	2.5	(NA)	(NA)
335143	Plate, sheet, and strip, including military cups and discs ----- do..	(S)	1.8	(NA)	(NA)
335152	Pipe and tube ----- do..	(S)		(NA)	(NA)
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- mil lb..	(S)	1.0	(NA)	(NA)
335405	Extruded shapes, including rod, bar, pipe, tube, etc. ----- do..	(S)	11.8	(NA)	(NA)
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	*2.3	6.3	(NA)	(NA)
335609	Nonferrous metal, except copper and aluminum ----- do..	(D)	( <sup>5</sup> )	(NA)	(NA)
	Castings (rough and semifinished):				
332011	Iron (gray and malleable) ----- 1,000 s tons..	(S)	10.0	(NA)	(NA)
332045	Steel ----- do..	(S)	10.3	(NA)	(NA)
336005	Aluminum and aluminum-base alloy ----- mil lb..	(S)	8.1	(NA)	(NA)
336006	Copper and copper-base alloy ----- do..	(S)	.7	(NA)	(NA)
336003	Other nonferrous ----- do..	(S)	-	(NA)	(NA)
345001	Bolts, nuts, screws, rivets, and screw machine products ----- do..	(X)	26.8	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies ----- do..	(X)	<sup>5</sup> 20.4	(NA)	(NA)
971000	Materials, parts, containers, supplies, n.s.k. <sup>2</sup> ----- do..	(X)	54.0	(NA)	(NA)
	<b>INDUSTRY 3594, FLUID POWER PUMPS AND MOTORS</b>				
	Materials, parts, containers, and supplies -----	(X)	500.7	(NA)	( <sup>4</sup> )
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons..	(S)	7.6	(NA)	(NA)
331012	Sheet and strip ----- do..	(S)	.5	(NA)	(NA)
331013	Plates ----- do..	(S)	.3	(NA)	(NA)
331015	Structural shapes ----- do..	(S)	.7	(NA)	(NA)
331055	All other ----- do..	(S)	3.9	(NA)	(NA)
	Alloy steel, except stainless:				
331021	Bars and bar shapes ----- 1,000 s tons..	(S)	9.3	(NA)	(NA)
331029	All other alloy steel mill shapes and forms ----- do..			(NA)	(NA)
	Stainless steel:				
331033	Sheet and strip ----- 1,000 s tons..	(S)	3.4	(NA)	(NA)
331050	All other stainless steel mill shapes and forms ----- do..			(NA)	(NA)
	Copper and copper-base alloy:				
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes ----- mil lb..	(S)	1.1	(NA)	(NA)
335143	Plate, sheet, and strip, including military cups and discs ----- do..			(NA)	(NA)
335152	Pipe and tube ----- do..			(NA)	(NA)
	Aluminum and aluminum-base alloy:				
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- mil lb..	(S)	6.2	(NA)	(NA)
335007	All other (sheet, plate, foil, wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	(S)	.3	(NA)	(NA)
335609	Nonferrous metal mill shapes and forms, except copper and aluminum ----- do..	(S)	.2	(NA)	(NA)
	Primary metals:				
331051	Pig iron, excluding silvery iron ----- 1,000 s tons..	-	-	(NA)	(NA)
333122	Copper and copper base alloy refinery shapes ----- do..	(D)	(D)	(NA)	(NA)
335792	Insulated copper wire and cable, except magnet wire (quantity of copper-content) ----- mil lb..	(S)	.2	(NA)	(NA)
339915	Metal powders ----- do..	(S)	6.7	(NA)	(NA)
190023	Iron and steel scrap, excluding home scrap ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
	Castings (rough and semifinished):				
332011	Iron (gray and malleable) ----- 1,000 s tons..	**35.8	35.3	(NA)	(NA)
332045	Steel ----- do..	(S)	4.9	(NA)	(NA)
336005	Aluminum and aluminum-base alloy ----- mil lb..	(S)	17.3	(NA)	(NA)
336006	Copper and copper-base alloy ----- do..	(D)	(D)	(NA)	(NA)
336008	Other nonferrous ----- do..	(S)	1.7	(NA)	(NA)
346200	Iron and steel forgings ----- 1,000 s tons..	(S)	6.1	(NA)	(NA)
346701	Metal stampings ----- do..	(S)	3.1	(NA)	(NA)
	Engines:				
351920	Diesel and semidiesel ----- thousands..	(Z)	(Z)	(NA)	(NA)
351901	Gasoline and other carburetor engines ----- do..	(Z)	(Z)	(NA)	(NA)
	Electric motors and generators:				
362115	Fractional horsepower electric motor (less than 1 hp), excluding timing motors ----- thousands..	(D)	(D)	(NA)	(NA)
362120	Integral horsepower motors and generators (1 hp or more) ----- do..	(S)	17.4	(NA)	(NA)

See footnotes at end of table.

Table 7. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity <sup>1</sup>	Delivered cost (million dollars)	Quantity <sup>1</sup>	Delivered cost (million dollars)
	<b>INDUSTRY 3594, FLUID POWER PUMPS AND MOTORS—Con.</b>				
	Bearings, including mounted and unmounted:				
356218	Ball -----	(X)	7.2	(NA)	(NA)
356201	Roller -----	(X)	14.4	(NA)	(NA)
356810	Plain bearings and bushings -----	(X)	4.7	(NA)	(NA)
356601	Speed changers, drives, gears, industrial high-speed drivers -----	(X)	5.3	(NA)	(NA)
265001	Paperboard containers, boxes, and corrugated paperboard -- 1,000 s tons--	(S)	2.2	(NA)	(NA)
305201	Rubber and plastics hose and belting -----	(X)	.7	(NA)	(NA)
306902	Fabricated rubber products, except tires, tubes, belts, hosing, and gaskets -----	(X)	4.1	(NA)	(NA)
308006	Fabricated plastics products, except gaskets, hose, and belting -----	(X)	.7	(NA)	(NA)
329300	Gaskets (all types) and asbestos packing -----	(X)	1.7	(NA)	(NA)
345001	Bolts, nuts, screws, rivets, and screw machine products -----	(X)	18.2	(NA)	(NA)
344301	Metal tanks, heat exchangers, steam condensers, and other boiler products, fabricated steel plate, and weldments -----	(X)	3.3	(NA)	(NA)
349402	Fabricated metal pipe, valves, and pipe fittings -----	(X)	7.4	(NA)	(NA)
354501	Cutting tools for machine tools -----	(X)	14.9	(NA)	(NA)
356101	Pumps and pump parts used as materials -----	(X)	28.2	(NA)	(NA)
356301	Air and gas compressors, except refrigeration ----- thousands--	(D)	(D)	(NA)	(NA)
357001	Electronic computing equipment and parts -----	(X)	(D)	(NA)	(NA)
360101	Electrical transmission, distribution, and control equipment -----	(X)	1.2	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies -----	(X)	138.4	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. <sup>2</sup> -----	(X)	103.5	(NA)	(NA)
	<b>INDUSTRY 3596, SCALES AND BALANCES, EXCEPT LABORATORY</b>				
	Materials, parts, containers, and supplies -----	(X)	241.1	(X)	201.5
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons--	(S)	5.5	(S)	8.2
331012	Sheet and strip ----- do--	(D)	(9)	(S)	16.1
331015	Structural shapes ----- do--	(S)	4.6	*19.5	11.1
331017	Wire and wire products ----- do--	(S)	.4	(S)	1.2
331056	All other carbon steel mill shapes and forms ----- do--	(S)	54.2	(S)	2.4
331020	Alloy steel, except stainless ----- do--	(S)	3.0	4.1	5.0
331031	Stainless steel ----- do--	(S)	1.8	(S)	2.7
335105	Copper and copper-base alloy ----- mil lb--	(D)	(9)	(S)	2.2
335001	Aluminum and aluminum-base alloy ----- do--	(S)	.7	(S)	
	Castings (rough and semifinished):				
332001	Iron (gray and malleable) and steel castings ----- 1,000 s tons--	(S)	1.7	(D)	(9)
336002	Nonferrous ----- mil lb--	(S)	2.8	(D)	(9)
	Bearings, including mounted and unmounted:				
356218	Ball -----	(X)	.2	(X)	2.8
356201	Roller -----	(X)	(Z)		3.8
344401	Sheet metal products, except stampings -----	(X)	3.3	(X)	1.1
346901	Metal stampings -----	(X)	1.4	(X)	2.8
345001	Bolts, nuts, screws, rivets, and screw machine products -----	(X)	2.3	(X)	12.4
367408	Semiconductors -----	(X)	8.8	(X)	
367002	Resistors, capacitors, transformers, transducers, and other electronic-type components and accessories, except semiconductors -----	(X)	17.7	(X)	16.4
364301	Appliance outlets, switches, lampholders, and other current-carrying wiring devices -----	(X)	4.9	(X)	2.6
360101	Electrical transmission distribution and control equipment, including switchgear, fuses, transformers, relays, regulators, etc. -----	(X)	5.1	(X)	6.7
265001	Paperboard boxes and containers and corrugated paperboard -----	(X)	1.8	(X)	2.4
308006	Fabricated plastics products, except gaskets, hose, and belting -----	(X)	3.7	(X)	3.6
970099	All other materials and components, parts, containers, and supplies -----	(X)	590.2	(X)	572.9
971000	Materials, parts, containers, and supplies, n.s.k. <sup>2</sup> -----	(X)	77.0	(X)	25.1
	<b>INDUSTRY 3599, INDUSTRIAL MACHINERY, N.E.C.</b>				
	Materials, parts, containers, and supplies -----	(X)	3 338.9	(NA)	(4)
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons--	(S)	99.0	(NA)	(NA)
331012	Sheet and strip ----- do--	(S)	28.5	(NA)	(NA)
331013	Plates ----- do--	(S)	37.8	(NA)	(NA)
331015	Structural shapes ----- do--	(S)	15.2	(NA)	(NA)
331017	Wire and wire products ----- do--	(S)	5.2	(NA)	(NA)
331019	All other carbon steel mill shapes and forms ----- do--	(S)	32.9	(NA)	(NA)
	Alloy steel, except stainless:				
331021	Bars and bar shapes ----- 1,000 s tons--	(S)	45.7	(NA)	(NA)
331029	All other alloy steel mill shapes and forms ----- do--	(S)	15.9	(NA)	(NA)
	Stainless steel:				
331033	Sheet and strip ----- 1,000 s tons--	(S)	42.3	(NA)	(NA)
331050	All other stainless steel mill shapes and forms ----- do--	(S)	39.9	(NA)	(NA)
	Copper and copper-base alloy:				
335102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes ----- mil lb--	(S)	14.6	(NA)	(NA)
335143	Plate, sheet, and strip, including military cups and discs ----- do--	*9.1	12.5	(NA)	(NA)
335152	Pipe and tube ----- do--	(S)	7.7	(NA)	(NA)

See footnotes at end of table.



Table 7. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity <sup>1</sup>	Delivered cost (million dollars)	Quantity <sup>1</sup>	Delivered cost (million dollars)
	<b>INDUSTRY 3599, INDUSTRIAL MACHINERY, N.E.C.—Con.</b>				
	Mill shapes and forms, except castings and forgings—Con.				
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ..... mil lb..	(S)	44.4	(NA)	(NA)
335405	Extruded shapes, including rod, bar, pipe, tube, etc. .... do..	(S)	34.7	(NA)	(NA)
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ..... do..	(S)	11.0	(NA)	(NA)
335609	Nonferrous metal, except copper and aluminum ..... do..	(S)	4.9	(NA)	(NA)
	Castings (rough and semifinished):				
332011	Iron (gray and malleable) ..... 1,000 s tons..	(S)	94.3	(NA)	(NA)
332045	Steel ..... do..	(S)	36.5	(NA)	(NA)
336005	Aluminum and aluminum-base alloy ..... mil lb..	(S)	158.2	(NA)	(NA)
336006	Copper and copper-base alloy ..... do..	(S)	9.7	(NA)	(NA)
336008	Other nonferrous ..... do..	(S)	30.1	(NA)	(NA)
345001	Bolts, nuts, screws, rivets, and screw machine products .....	(X)	29.0	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies.....	(X)	383.5	(NA)	(NA)
971000	Materials, parts, containers, supplies, n.s.k. <sup>2</sup> .....	(X)	2 105.4	(NA)	(NA)

<sup>1</sup>For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: \* 10 to 19 percent estimated; \*\* 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

<sup>2</sup>Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

<sup>3</sup>For 1982, data for material codes 280020 and 320601 were not collected separately but included with material code 970099.

<sup>4</sup>Industry definition is new for 1987 and, therefore, 1987 data for materials consumed are not comparable to prior-year data. As a result, 1982 materials consumed data are not available.

<sup>5</sup>Data have been combined with material code 970099 to avoid disclosing data for individual companies.

<sup>6</sup>For 1987, data for material code 331012 have been combined with material code 331056 to avoid disclosing data for individual companies.





# APPENDIX A.

## Explanation of Terms

This appendix is in two sections. Section 1 includes items requested of all establishments mailed census of manufactures forms including annual survey of manufactures (ASM) forms. Note that this section also includes several items (number of establishments and companies, value added, classes of products, and specialization and coverage ratios) not included on the report forms but derived from information collected on the forms. Section 2 covers supplementary items requested only from establishments included in the ASM sample. Results of the supplementary ASM inquiries are included in table 3c of this report.

### SECTION 1. ITEMS COLLECTED OR DERIVED BASED ON ALL CENSUS OF MANUFACTURES (INCLUDING ASM) REPORT FORMS

**Number of establishments and companies**—As discussed in the Introduction, a separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

If the company operated at different physical locations, even if the individual locations were producing the same line of goods, a separate report was requested for each location. If the company operated in two or more distinct lines of manufacturing at the same location, a separate report was requested for each activity.

An establishment not in operation for any portion of the year was requested to return the report form with the proper notation in the "Operational Status" section of the form. In addition, the establishment was requested to report data on any employees, capital expenditures, inventories, or shipments from inventories during the year.

In this report, data are shown for establishments in operation at any time during the year. A comparison with the number of establishments in operation at the end of the year will be provided in the Introduction of the General Summary subject report.

**Employment and related items**—The report forms requested separate information on production workers for a specific payroll period within each quarter of the year and on other employees as of the payroll period which included the 12th of March.

**All employees**—This item includes all full-time and part-time employees on the payrolls of operating manufacturing establishments during any part of the pay period which included the 12th of the months specified on the report form. Included are all persons on paid sick leave, paid holidays, and paid vacations during these pay periods.

Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average for the payroll periods including the 12th of March, May, August, and November.

**Production workers**—This item includes workers (up through the line-supervisor level) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial and guard services, product development, auxiliary production for plant's own use (e.g., power plant), recordkeeping, and other services closely associated with these production operations at the establishment covered by the report. Employees above the working-supervisor level are excluded from this item.

**All other employees**—This item covers nonproduction employees of the manufacturing establishment including those engaged in factory supervision above the line-supervisor level. It includes sales (including driver salespersons), sales delivery (highway truck drivers and their helpers), advertising, credit, collection, installation and servicing of own products, clerical and routine office function, executive, purchasing, financing, legal, personnel (including cafeteria, medical, etc.), professional, and technical employees. Also included are employees on the payroll of the manufacturing establishment engaged in the construction of major additions or alterations to the plant and utilized as a separate work force.

In addition to reports sent to operating manufacturing establishments, information on employment during the payroll period which included March 12 and annual payrolls also was requested of auxiliary units (e.g., administrative offices, warehouses, and research and development laboratories) of multiestablishment companies. However, these figures are not included in the totals for individual



industries shown in this report. They are included in the general summary and geographic area reports as a separate category.

**Payroll**—This item includes the gross earnings of all employees on the payroll of operating manufacturing establishments paid in the calendar year 1987. Respondents were told they could follow the definition of payrolls used for calculating the Federal withholding tax. It includes all forms of compensation, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. The total includes salaries of officers of corporations; it excludes payments to proprietors or partners of unincorporated concerns. Also excluded are payments to members of Armed Forces and pensioners carried on the active payroll of manufacturing establishments.

The census definition of payrolls is identical to that recommended to all Federal statistical agencies by the Office of Management and Budget. It should be noted that this definition does not include employers' Social Security contributions or other nonpayroll labor costs, such as employees' pension plans, group insurance premiums, and workers' compensation.

The ASM provides estimates of employers' supplemental labor costs, both those required by Federal and State laws and those incurred voluntarily or as part of collective bargaining agreements. (Supplemental labor costs are explained later in this appendix.)

As in the case of employment figures, the payrolls of separate auxiliary units of multiestablishment companies are not included in the totals for individual industries or industry groups.

**Production-worker hours**—This item covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave.

**Cost of materials**—This term refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuel consumed, whether purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (1) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year, (2) electric energy purchased, (3) fuels consumed for heat, power, or the generation of electricity, (4) work done by

others on materials or parts furnished by manufacturing establishments (contract work), and (5) products bought and resold in the same condition. (See discussion of duplication of data below.)

**Specific materials consumed**—In addition to the total cost of materials, which every establishment was required to report, information also was collected for most manufacturing industries on the consumption of major materials used in manufacturing. The inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers' records. Information on the establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which either administrative records or short forms were used was imputed as "not specified by kind." (See the introduction for the importance of administrative records in the industry.)

**Value of shipments**—This item covers the received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and resold without further processing. Included are all items made by or for the establishments from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, including not only the direct cost of production but also a reasonable proportion of "all other costs" (including company overhead) and profit. (See discussion of duplication of data below.)

**Individual products**—As in previous censuses, data were collected for most industries on the quantity and value of individual products shipped. In the 1987 census program, information was collected on the output of approximately 11,000 individual product items. The term "product", as used in the census of manufactures, represents the finest level of detail for which output information was requested. Consequently, it is not necessarily synonymous with the term "product" as used in the marketing sense. In some cases, it may be much more detailed and, in other cases, it is more aggregative. For example, "pharmaceutical preparations" was distributed into over 100 terms; whereas, "motor gasoline" was reported as a single item.

Approximately 6,600 of the product items were listed separately on the 1987 census report forms. Data for



about 4,400 products were obtained in the monthly, quarterly, or annual surveys comprising the Current Industrial Reports series of the Census Bureau. Totals for the year 1987 for these items, as derived from the commodity surveys, are shown in the "products shipped" table (table 6a-2).

The list of products for which separate information was collected was prepared after consultation with industry and government representatives. Comparability with previous figures was given considerable weight in the selection of product categories so that comparable 1982 information is presented for most products.

Typically, both quantity and value of shipments information were collected. However, if quantity was not significant or could not be reported by manufacturers, only value of shipments was collected.

Shipments include both commercial shipments and transfers of products to other plants of the same company. For industries in which a considerable portion of the total shipments is transferred to other plants of the same company, separate information on interplant transfers also was collected. Moreover, for products that are used to a large degree within the same establishment as materials or components in the fabrication of other products, total production and often consumption of the item within the plant was collected. Typically, the information on production also was collected for products for which there are significant differences between total production and shipments in a given year because of wide fluctuations in finished goods inventories. Other measures of output of products with long production cycles were used as appropriate and feasible.

**Classes of products**—To summarize the product information, the separate products were aggregated into classes of products that, in turn, were grouped into all primary products of each industry. The code structure used is a seven-digit number for the individual product, a five-digit number for the class of product, and a four-digit number for the total primary products in an industry. (See Introduction, Industry Classification of Establishments, for application of the coding structure to the assignment of SIC codes for establishments.)

In the 1987 census, the 11,000 products were grouped into approximately 1,500 separate classes on the basis of general similarity of manufacturing processes, types of materials used, and the like. However, the grouping of products was affected by the economic significance of the class and, in some cases, dissimilar products were grouped because the products were not sufficiently significant to warrant separate classes.

**Duplication in cost of materials and value of shipments**—The aggregate of the cost of materials and value of shipments figures for industry groups and for all manufacturing industries includes large amounts of duplication since the products of some industries are used as materials by others. This duplication results, in part, from the

addition of related industries representing successive stages in the production of a finished manufactured product. Examples are the addition of flour mills to bakeries in the food group and the addition of pulp mills to paper mills in the paper and allied products group of industries. Estimates of the overall extent of this duplication indicate that the value of manufactured products exclusive of such duplication (the value of finished manufactures) tends to approximate two-thirds of the total value of products reported in the annual survey.

Duplication of products within individual industries is significant within a number of industry groups, e.g., machinery and transportation industries. These industries frequently include complete machinery and their parts. In this case, the parts made for original equipment are materials consumed for assembly plants in the same industry.

Even when no significant amount of duplication is involved, value of shipments figures are deficient as measures of the relative economic importance of individual manufacturing industries or geographic areas because of the wide variation in ratio of materials, labor, and other processing costs of value of shipments, both among industries and within the same industry.

Before 1962, cost of materials and value of shipments were not published for some industries which included considerable duplication. Since then, these data have been published for all industries at the United States level and beginning in 1964, for all geographic levels.

**Value added by manufacture**—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process inventories between the beginning- and end-of-year inventories.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1a), value added is adjusted only for the change in work-in-process inventories between the beginning and end of year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

"Value added" avoids the duplication in the figure for value of shipments that results from the use of products of some establishments as materials by others. Value added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

**New and used capital expenditures**—For establishments in operation and any known plants under construction, manufacturers were asked to report their new expenditures for (1) permanent additions and major alterations to



manufacturing establishments, and (2) machinery and equipment used for replacement and additions to plant capacity if they were of the type for which depreciation accounts were ordinarily maintained.

The totals for new expenditures include expenditures leased from nonmanufacturing concerns through capital leases, new facilities owned by the Federal Government but operated under contract by private companies, and plant and equipment furnished to the manufacturer by communities and nonprofit organizations. Also excluded are expenditures for used plant and equipment (although reported in the census), expenditures for land, and cost of maintenance and repairs charged as current operating expenses.

Manufacturers also were requested to report the value of all used buildings and equipment purchased during the year at the purchase price. For any equipment or structure transferred for the use of the reporting establishment by the parent company or one of its subsidiaries, the value at which it was transferred to the establishment was to be reported. Furthermore, if the establishment changed ownership during the year, the cost of the fixed assets (building and equipment) was to be reported under used capital expenditures.

Total expenditures for used plant and equipment is a universe figure; it is collected on all census forms. However, the breakdown of this figure between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. The data for total new capital expenditures, new building expenditures, and new machinery expenditures, as well as the data for total used expenditures, are shown in table 3b.

**End-of-year inventories**—Respondents were asked to report their 1986 and 1987 end-of-year inventories at cost or market. Effective with the 1982 Economic Censuses, this change to a uniform instruction for reporting inventories was introduced for all sector reports. Prior to 1982, respondents were permitted to value inventories using any generally accepted accounting method (FIFO, LIFO, market, to name a few). In 1982, LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve.

## SECTION 2. ITEMS COLLECTED ONLY ON ASM REPORT FORMS

The following items were collected only from establishments included in the ASM sample:

1. **Supplemental labor costs**—Supplemental labor costs are divided into legally required expenditures and payments for voluntary programs. The legally required portion consists primarily of Federal old age and survivors' insurance, unemployment compensation, and workers' compensation. Payments for voluntary programs include all programs not

Because of this change in reporting instructions, the 1982 through 1987 data for inventories and value added by manufacture included in the tables of this report are not comparable to the prior-year data shown in table 1a of this report and in historical census of manufactures and annual survey of manufactures publications.

In using inventory data by stage of fabrication for "all industries" and at the two-digit industry level, it should be noted that an item treated as a finished product by an establishment in one industry may be reported as a raw material by another establishment in a different industry. For example, the finished-product inventories of a steel mill would be reported as raw materials by a stamping plant. Such differences are present in the inventory figures by stage of fabrication shown for individual industries, industry groups, and "all manufacturing", which are aggregates of figures reported by establishments in specified industries.

**Specialization and coverage ratios**—These items are not collected on the report forms but are derived from the data shown in table 5b. An establishment is classified in a particular industry if its shipments of primary products of that industry exceed in value its shipments of the products of any other single industry.

As noted in the introduction, an establishment's shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). Specialization and coverage ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in tables 1a through 5a and data on product shipments shown in tables 6a through 6c.

Specialization ratio represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments wherever classified.

specifically required by legislation whether they were employer initiated or the result of collective bargaining. They include the employer portion of such plans as insurance premiums, premiums for supplemental accident and sickness insurance, pension plans, supplemental unemployment compensation, welfare plans, stock purchase plans on which the employer payment is not subject to withholding tax, and deferred profit-sharing plans.



They exclude such items as company-operated cafeterias, in-plant medical services, free parking lots, discounts on employee purchases, and uniforms and work clothing for employees. While the excluded items do benefit employees and all or part of their cost generally is similar to the items covered in the ASM labor costs statistics, accounting records generally do not provide reliable figures on net employee benefits of these types.

2. **Retirements of depreciable assets**—Included in this item is the gross value of assets sold, retired, scrapped, destroyed, etc., during 1987. When a complete operation or establishment changed ownership, the respondent was instructed to report the value of the assets sold at the original cost as recorded in the books of the seller. The respondent also was requested to report retirements of equipment or structures owned by a parent company that the establishment was using as if it were a tenant.
3. **Depreciation charges for fixed assets**—This item includes depreciation and amortization charged during the year against assets. Depreciation charged against fixed assets acquired since the beginning of the year and against assets sold or retired during the year are components of this category. Respondents were requested to make certain that they did not report accumulated depreciation.
4. **Rental payments**—Total rental payments is collected on all census forms. However, the breakdown between rental payments for buildings and other structures and rental payments for machinery and equipment is collected only on the ASM forms. This item includes rental payments for the use of all items for which depreciation reserves would be maintained if they were owned by the establishment, e.g., structures and buildings, and production, office, and transportation equipment. Excluded are royalties and other payments for the use of intangibles and depletable assets, and land rents where separable.

When an establishment of a multiestablishment company was charged rent by another part of the same company for the use of assets owned by the company, it was instructed to exclude that cost from rental payments. However, the book value (original cost) of these company-owned assets was to be reported as assets of the establishment at the end of the year.

If there were assets at an establishment rented from another company and the rents were paid centrally by the head office of the establishment, the company was instructed to report these rental payments as if they were paid directly by the establishment.

5. **Depreciable assets**—Total value of gross depreciable assets is collected on all census forms.

However, the detail for depreciable assets is collected only on the ASM forms. The data encompass all fixed depreciable assets on the books of establishments at the beginning and end of the year. The values shown (book value) represent the actual cost of assets at the time they were acquired, including all costs incurred in making the assets usable (such as transportation and installation). Included are all buildings, structures, machinery, and equipment (production, office, and transportation equipment) for which depreciation reserves are maintained. Excluded are nondepreciable capital assets, including inventories and intangible assets, such as timber and mineral rights.

The definition of fixed depreciable assets is consistent with the definition of capital expenditures. For example, expenditures include actual capital outlays during the year, rather than the final value of equipment put in place and buildings completed during the year. Accordingly, the value of assets at the end of the year includes the value of construction in progress. In addition, respondents were requested to make certain that assets at the beginning of the year plus new and used capital expenditures, less retirements, equalled assets at the end of the year.

6. **New and used capital expenditures**—The data for total new capital expenditures, new building expenditures, new machinery expenditures, and total used capital expenditures are collected on all census forms. However, the breakdown between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. (See further explanation on capital expenditures in section 1.)
7. **Quantity of electric energy consumed for heat and power**—Data on the cost of purchased electric energy were collected on all census forms. However, data on the quantity of purchased electric energy were collected only on the ASM forms. In addition, information was collected on the quantity of electric energy generated by the establishment and the quantity of electric energy sold or transferred to other plants of the same company.
8. **Breakdown of new capital expenditures for machinery and equipment**—ASM establishments were requested to separate their capital expenditures for new machinery and equipment into (1) automobiles, trucks, etc., for highway use, (2) computers and peripheral data processing equipment, and (3) all other.

The category "automobiles, trucks, etc., for highway use" is intended to measure expenditures for vehicles designed for highway use that were acquired through a purchase or lease-purchase agreement.



Vehicles normally operating off public highways (vehicles specifically designed to transport materials, property, or equipment on mining, construction, logging, and petroleum development projects) are excluded from this item.

9. **Foreign content of cost of materials**—Establishments included in the ASM sample panel were requested to provide information on foreign-made materials purchased or transferred from foreign sources. This includes materials acquired from a central warehouse or other domestic establishment of the same company but made in an operation outside of the 50 States, District of Columbia, Puerto Rico, or U.S. territories.

10. **Cost of purchased services**—ASM establishments were requested to provide information on the cost of purchased services for the repair of buildings and other structures, the repair of machinery, and communication services. Included in the cost of purchased services for the repair of buildings and machinery are payments made for all maintenance and repair work on buildings and equipment, such as painting, roof repairs, replacing parts, and overhauling equipment. Such payments made to other establishments of the same company and for repair and maintenance of any leased property also are included. Extensive repairs or reconstruction that were capitalized are considered capital expenditures for used buildings and machinery and are, therefore, excluded from this item. Repair and maintenance costs provided by an owner as part of a rental contract or incurred directly by an establishment in using its own work force also are excluded.

Three basic approaches were utilized to produce these statistics.

1. For items 1 through 6, data were estimated (imputed) for all non-ASM establishments using the available data in the establishment record and industry-based parameters. The statistics were then generated by simply tabulating all census records including the imputed value for non-ASM establishments and the unweighted value for ASM establishments. Separate imputation rates were developed and are shown in the table. For quantity of purchased electricity for heat and power (item 7), a similar procedure was used; however, the imputation parameters were geographically-based instead of industry-based. For quantities of generated less sold electricity, no imputation was performed for non-ASM establishments. The estimates for these items are simply tabulations of unweighted ASM values.

Since the published statistics for these items were developed from the complete census universe and not just the ASM establishments, there are no sampling variances associated with these statistics. However, there is an unknown level of bias for each of the items due to the imputation of the non-ASM establishments. This bias is felt to be small due to the strong correlation between the items being imputed and the collected items that were used to generate the impute values.

2. For items 8 and 9, the estimates were developed using a ratio estimation methodology. For item 8, an estimate of the breakout of new capital expenditures for machinery and equipment into the three categories was made from ASM establishments reporting these categories. The estimated proportions were then applied to the corresponding Census value for new capital expenditures for machinery and equipment to produce the estimates.

The estimates for item 9, foreign content of cost of materials, were developed in a similar manner based on costs of parts, supplies, and components (item 5a) as the control total for the three categories.

For items 8 and 9, an adjustment ratio of the following form was computed.

$$R_j = \frac{NM_c}{TME_{asm}}$$

where:

$NM_c$  = the census value of new capital expenditures for machinery and equipment

$TME_{asm}$  = the weighted ASM value of new capital expenditures for machinery and equipment from reporters of the detailed breakout data

3. For item 10, cost of purchased services, the estimates were made by simply tabulating weighted data for all the ASM records that reported the item. A response coverage ratio (a measure of the extent to which respondents reported for each item) is shown in table 3c for the three types of services. It is derived for each item by calculating the ratio of the weighted employment (establishment data multiplied by sample weight, see appendix B) for those ASM establishments that reported the specific inquiry to the weighted total employment for all ASM establishments classified in the industry.



# **APPENDIX B.**

## **Annual Survey of Manufactures (ASM) Sampling and Estimating Methodologies**

### **DESCRIPTION OF SURVEY SAMPLE**

The Annual Survey of Manufactures (ASM) contains two components. The mail portion of the survey is a probability sample of about 56,000 manufacturing establishments selected from a total of about 220,000 establishments. These 220,000 establishments represent all manufacturing establishments of multiunit companies and all single establishment companies mailed schedules in the 1982 Census of Manufactures. This mail portion is supplemented annually by a Social Security Administration list of new manufacturing establishments opened after 1982 and a list of new multiunit manufacturing establishments identified from the Census Bureau's Company Organization Survey.

The 1984 through 1988 ASM sample differs slightly from the previous sample. For the current panel, all establishments of companies with 1982 shipments in manufacturing in excess of \$500 million were included in the survey panel with certainty. There are approximately 500 such companies collectively accounting for approximately 18,000 establishments. For the remaining portion of the mail survey, the establishment was defined as the sampling unit. For this portion, all establishments with 250 employees or more and establishments with a very large value of shipments also were included in the survey panel with certainty. A total of 12,100 establishments were selected from this portion of the universe with certainty. Therefore, of the 56,000 manufacturing establishments included in the ASM panel, approximately 31,000 are selected with certainty. These certainty establishments collectively account for approximately 80 percent of the total value of shipments in the 1982 census.

Smaller establishments in the remaining portion of the mail survey were sampled with probabilities ranging from 0.999 to 0.005 in accordance with mathematical theory for optimum allocation of a sample. The probabilities of selection assigned to the smaller establishments were proportional to measures of size determined for each establishment. The measures of size depend directly upon each establishment's 1982 product class values and the historic variability of the year-to-year shipments of each product class. Product classes displaying more volatile year-to-year change in shipments at the establishment level were sampled at a heavier rate.

This method of assigning measures of size was used in order to maximize the precision (that is, minimize the variance of estimates of the year-to-year change) in the value of product class shipments. Implicitly, it also gave weight differences in employment, value added, and other

general statistics, since these are highly correlated with value of shipments. Individual sample selection probabilities were obtained by multiplying each establishment's final measure of size by an overall sampling fraction coefficient calculated to yield a total expected sample size.

The sample selection procedure gave each establishment in the sampling frame an independent chance of selection. This method of independent selection permits the rotation of small establishments out of a given sample panel without introducing a bias into the survey estimates.

The nonmail portion of the survey includes all single-establishment companies that were tabulated as administrative records in the 1982 Census of Manufactures. Although this portion contained approximately 130,000 establishments, it accounted for less than 2 percent of the estimate for total value of shipments at the total manufacturing level. This portion was not sampled; rather, the data for every establishment in this group were estimated based on selected information obtained annually from the administrative records of the Internal Revenue Service and the Social Security Administration. This administrative-record information, which includes payroll, total employment, industry classification, and physical location of the establishment, was obtained under conditions which safeguard the confidentiality of both tax and census records. Estimates of data other than payroll and employment for these small establishments were developed from industry averages.

The corresponding estimates for the mail and nonmail establishments were added together, along with the base-year differences, as defined in the Description of Estimating Procedure section, to produce the figures shown in this publication.

### **DESCRIPTION OF ESTIMATING PROCEDURES**

Most of the ASM estimates for the years 1983-1986 were computed using a difference estimation procedure. For each item, a base-year difference was developed. This base-year difference is equal to the difference between the 1982 census published number for an item total and the linear ASM estimate of the total for 1982. The ASM linear estimate was obtained by multiplying each sample establishment's data by its sample weight (the reciprocal of its probability of selection) and summing the weighted values.

These base-year differences were then added to the corresponding current-year linear estimates, which include the sum of the estimates for the mail and nonmail establishments, to produce the estimates for the years 1983-1986. Estimates developed by this procedure usually are far more reliable than comparable linear estimates developed from the current sample data alone.



The 1987 sample estimates for the purchased service items, shown in table 3c, are strictly ASM linear estimates, however, developed only from ASM establishments that reported the specific item.

The remaining estimates in table 3c, showing the breakdown of expenditures for new machinery and equipment and costs of parts (separated into purchases from foreign sources and purchases from domestic sources), were computed as ratio estimates. To do this, linear estimates of the new machinery detail items were developed from the ASM establishments and were ratio adjusted to the corresponding census total for new machinery. In a similar fashion, the ASM linear estimates of the detailed purchased materials items were ratio adjusted to the corresponding census total for cost of parts.

## QUALIFICATIONS OF THE DATA

The estimates developed from the sample are apt to differ somewhat from the results of a survey covering all companies in the sampled lists but otherwise conducted under essentially the same conditions as the actual sample survey. The estimates of the magnitude of the sampling errors (the differences between the estimates obtained and the results theoretically obtained from a comparable, complete-coverage survey) are provided by the standard errors of the estimates.

The particular sample selected for the ASM is one of a large number of similar probability samples that, by chance, might have been selected under the same specifications. Each of the possible samples would yield somewhat different sets of results, and the standard errors are measures of the variation of all the possible sample estimates around the theoretical, comparable, complete-coverage values.

Estimates of the standard errors have been computed from the sample data for selected statistics in this report. They are presented in the form of relative standard errors (the standard errors divided by the estimated values to which they refer).

In conjunction with its associated estimate, the relative standard error may be used to define confidence intervals (ranges that would include the comparable, complete-coverage value for specified percentages of all the possible samples).

The complete coverage value would be included in the range:

1. From one standard error below to one standard error above the derived estimate for about two-thirds of all possible samples.
2. From two standard errors below to two standard errors above the derived estimate for about 19 of 20 of all possible samples.
3. From three standard errors below to three standard errors above the derived estimate for nearly all samples.

An inference that the comparable, complete-survey result would be within the indicated ranges would be correct in approximately the relative frequencies shown. Those proportions, therefore, may be interpreted as defining the confidence that the estimates from a particular sample would differ from complete-coverage results by as much as one, two, or three standard errors, respectively.

For example, suppose an estimated total is shown as 50,000 with an associated relative standard error of 2 percent, that is, a standard error of 1,000 (2 percent of 50,000). There is approximately 67 percent confidence that the interval 49,000 to 51,000 includes the complete-coverage total, about 95 percent confidence that the interval 48,000 to 52,000 includes the complete-coverage total and almost certain confidence that the interval 47,000 to 53,000 includes the complete coverage total.

In addition to the sample errors, the estimates are subject to various response and operational errors: errors of collection, reporting, coding, transcription, imputation for nonresponse, etc. These operational errors also would occur if a complete canvass were to be conducted under the same conditions as the survey. Explicit measures of their effects generally are not available. However, it is believed that most of the important operational errors were detected and corrected in the course of the Bureau's review of the data for reasonableness and consistency. The small operational errors usually remain. To some extent, they are compensating in the aggregated totals shown. When important operational errors were detected too late to correct the estimates, the data were suppressed or were specifically qualified in the tables.

As derived, the estimated standard errors included part of the effect of the operational errors. The total errors, which depend upon the joint effect of the sampling and operational errors, are usually of the order of size indicated by the standard error, or only moderately higher. However, for particular estimates, the total error may considerably exceed the standard errors shown.

The concept of complete coverage under the conditions prevailing for the ASM is not identical to the complete coverage of the census of manufactures, as the censuses have been conducted. Nearly all types of operational errors that affect the ASM also occur in the censuses. The ASM and the censuses, are conducted under quite different conditions, and operational errors can be better controlled in the ASM than in the censuses. As a result, for many of the census figures, the errors are of the same order of size as the total errors of the corresponding annual survey estimates. The differences between the census and ASM operating conditions also disturb, to some degree, the comparability of the ASM and census data.

Any figures shown in the tables in this publication having an associated standard error exceeding 15 percent may be of limited reliability. However, the figure may be combined with higher-level totals, creating a broader aggregate, which then may be of acceptable reliability.



# APPENDIX C.

## Changes in Census of Manufactures

### Product Classes for 1987

[Based on revisions to the Standard Industrial Classification (SIC) Manual, definitions of some product classes were revised for 1987. Listed below are the revisions to the product classes]

1987	1982	1987	1982	1987	1982	1987	1982
30521	30411	30899 3089A	3079K pt	34919	34948	35483	36233
30522	30412	32295	32291 pt	34921	3494B	35484	35496
30523	30413	32296	32292 pt	34922	3494C	35485	35495 pt 35497
30524	30414	32297	32294 pt	34923	3494D	35533	35531 pt
30525	30415	32298	32291 pt 32292 pt 32294 pt	34924	3494E	35534	35532 pt
30526	30416	32311	32317	34925	3494F	35543	35541 35542 pt
30534	32934	32312	32317	34926	3494G	35544	35542 pt
30535	32935	32927	32928 32929	34927	3494H	35558	35557 pt
30536	32936	32961	32963 32965	3523C	35234 pt 35237 35238 pt	35561	35511
30537	32937	32962	32964 32966	3523E	35234 pt 35238 pt	35562	35512
30538	32938	33152	33152 34967	3523F	3523A 3523B	35563	35513 pt
30539	32939	33391	33331	35246	35243 35245	35591	35591 35699 pt
30611	3069A pt	33392	33334	3531A	35311	35596	35595 pt
30612	3069A pt	33398	33321 33323 33399	3531B	35312	35597	35494
30613	3069A pt	33561 33562 33563	33569	3531C	35317	35599	35595 pt 36360 36362
30614	3069B pt	33630	33611	3531E	35314 pt	35616	3561C
30615	3069B pt	33640	33620 pt 33691 pt 33692 pt 33693 pt	3531F	35316	35631	35631 pt
30616	3069B pt	34234	34232 pt	3531G	35318 pt	35651	35513 pt 35514 pt 35691 pt
30617	3069B pt	34235	34232 pt 35531 pt 35532 pt	3531H	35313 pt 35318 pt 35319 pt	35652	35513 pt 35514 pt 35691 pt
3069C	3069C 35557 pt	34236	34233	3531K	35319 pt 35361 pt 35371 pt	35676	35672
3069E	30310	34441 34443 34447 34448 34449	34446	3531M	35313 pt 35314 pt 35319 pt 35372 pt	35692	35694 35695 35696
30810	30792	34461 34462 34463 34464 34465	34460	35337	35331 35332 pt	35697 35698	35699 pt
30820	3079K pt	34911 34912 34913 34914 34915 34916	3494A	35338	35332 pt	35711	35731 36629 pt
30830	3079K pt	34917	34949	35339	35333	35712	35734 pt 35735 pt
30840	30794	34918	34947	3533A	35335	35721	35732 pt
30850	30795	34919	34948	3533B	35336	35722	35734 pt 35735 pt
30861 30862 30863 30864 30865 30866	30797	34921	3494B	35363	35361 pt	35751	35732 pt 36612 pt
30870	3079K pt	34922	3494C	35364	35362 pt	35752	35734 pt 35735 pt
30880	3079J pt 3079K pt	34923	3494D	35373	35362 pt 35371 pt	35771	35732 pt
30891	3079J pt 3079K pt	34924	3494E	35374	35362 pt 35372 pt	35772	35734 pt 35735 pt
30892	3079J pt 3079K pt	34925	3494F	3541D	35411 35412	35781	35743
30893	3079J pt 3079K pt	34926	3494G	35430	35650	35782	35744
30894	3079J pt 3079K pt	34927	3494H	35454	35453	35783	35745
30895	3079J pt	34928	34949	35455	35452	3585C	3585A 36993
30896	2499A pt 3079J pt 3079K pt	34929	34947	35481	36231	3585D	3585B 36994 pt
30897	3079J pt 3079K pt	34930		35482	36232		
30898	3079J pt 3079K pt	34931					

[Based on revisions to the Standard Industrial Classification (SIC) Manual, definitions of some product classes were revised for 1987. Listed below are the revisions to the product classes]

1987	1982	1987	1982	1987	1982	1987	1982
35931	35996 35997	36411	36410	36991—Con. 36995	36629 pt—Con.	38731—Con.	38734—Con. 38736 38737
35932	35998	36412	36994 pt	36997	35497 pt 36629 pt	39113 39114	39112
35933	35999	36520	36521 pt	36998	36994 pt	39153 39154	39151
35941	35617 35618 35631 pt	36613	35732 pt 36612 pt	3714A	37143	39447	36629 pt 39447
35942	3561A 3561B 35631 pt	36614	36612 pt	37999	37994 37998	39493	39494 pt
35961 35962 35963	35760	36631	36621 36629 pt	38121	38111	39495	3079k pt
36123 36126	36125	36632	36622	38122	36625 pt 36629	39496	39494 pt
36251	36138 pt 36794	36691	36624	38210	38112 38113 pt	39523	39521 39522 pt
36252	36221	36692	36626	38260	38320 38326	39524	39522 pt
36253	36222	36693	36628	38271	38324	39651	39630
36254	36138 pt 36223	36714	36711 36712	38272 38273	38325	39654	39641
36330	36331 36333	36715	36799 pt	38295	36625 pt 38293	39656	39642
36395	36361 36394 36399	36720	36797	38296	38113 pt	39998	39620
		36799	36629 pt 36799 pt	38440	36931	39999	39995
		36950	35732 pt 36792	38450	36930 36933	97372	36522
		36991 36992	36629 pt	38731	38734	97819	36521 pt



# APPENDIX D.

## Changes in Census of Manufactures

### Product Codes for 1987

[Based on revisions to the Standard Industrial Classification (SIC) Manual, definitions of some product codes were revised for 1987. Listed below are the revisions to the product codes. The terms published and collected are defined as follows: (1) published refers to the code used in the published reports for 1987 and 1982, and (2) collected refers to the code appearing on the report forms for 1987]

1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published				
30118 00	30118 00	30118 19 30118 20	30539 77	32939 77	32939 77	30830 11 30830 13 30830 19	30793 01 30793 03 30793 09	3079K 90	30892 20— Con.	3079D 33— Con.	3079J 61 pt —Con. 3079J 66 pt 3079K 93 pt				
3011A 39	3011A 39	3011A 33 3011A 35	30539 79	32939 79	32939 79	30840 11	30794 21	30794 21	30892 30	3079D 35	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt				
3011C 29	3011C 29	3011C 24 3011C 26 3011C 27	30611 00	3069A 00	3069A 11		30840 12	30794 22			30794 22				
30521 00	30411 00	30411 00	30612 00	3069A 00	3069A 12 3069A 15	30840 13	30794 23	30794 23							
30522 00	30412 00	30412 00	30613 00	3069A 00	3069A 13 3069A 14 3069A 16	30840 14	30794 24	30794 24							
30523 00	30413 00	30413 00	30614 00	3069B 00	3069B 11	30840 15	30794 25	30794 25	30892 90	3079D 39	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt				
30524 00	30414 00	30414 00				30840 19	30794 26	30794 26							
30525 00	30415 00	30415 00	30615 00	3069B 00	3069B 12 3069B 13 3069B 14 3069B 19	30850 00	30795 00	30795 00							
30526 00	30416 00	30416 00	30616 00	3069B 00	3069B 21	30861 00	30797 41	30797 41							
30534 11	32934 11	32934 11				30862 10 30862 20 30862 90	30797 51 30797 53 30797 59	30797 42							
30534 13	32934 13	32934 13	30617 00	3069B 00	3069B 29	30863 10 30863 90	30797 61 30797 69	30797 44	30893 00	3079F 22	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt				
30534 15	32934 15	32934 15	30697 77	30697 77	30697 11 30697 78		30864 10 30864 20 30864 30 30864 90	30797 71 30797 73 30797 75 30797 79			30797 45				
30534 17	32934 17	32934 17	3069C 12	35558 72	35557 72	30865 10 30865 20 30865 30 30865 40 30865 90	30797 81 30797 83 30797 85 30797 86 30797 89	30797 46							
30535 11	32935 11	32935 11	3069C 30	35558 76	35557 76	30866 10	30797 43	30797 43			30894 01	30798 01	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt		
30535 13	32935 13	32935 13	3069D 20	3069D 20	3069D 17 3069D 19				30870 12 30870 13	30791 01 30791 02			3079K 99		
30535 15	32935 15	32935 15	3069D 42	3069D 42	3069D 55 3069D 58	30880 00	3079F 20	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30894 02	30798 02			3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt		
30535 17	32935 17	32935 17	3069E 20	30310 00	30310 00								30866 90	30797 47	30797 47
30535 19	32935 19	32935 19	30810 10	30792 11	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30891 01	3079C 11	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt			30894 03	30798 03	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt		
30535 21	32935 21	32935 21	30810 20	30792 12	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt								30891 03	3079C 13	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt
30535 23	32935 23	32935 23	30810 30	30792 13	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30891 09	3079C 19	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30894 04	30798 04			3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt		
30535 25	32935 25	32935 25	30810 40	30792 14	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt								30892 10	3079D 31	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt
30535 29	32935 29	32935 29	30810 50	30792 19	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			30894 05	30798 05	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt		
30536 21	32936 21	32936 21	30820 10 30820 20 30820 30 30820 40 30820 50 30820 60 30820 70 30820 80 30820 90	30796 01 30796 02 30796 03 30796 04 30796 05 30796 06 30796 07 30796 08 30796 19	3079K 80								30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30536 22	32936 22	32936 22	30537 29	32937 29	32937 29	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt	30894 07	30798 07					
30536 25	32936 25	32936 25	30537 39	32937 39	32937 39								30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30536 26	32936 26	32936 26	30537 41	32937 41	32937 41	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			30894 09	30798 09			
30536 30	32936 30	32936 30	30537 43	32937 43	32937 43								30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30536 35	32936 35	32936 35	30537 49	32937 49	32937 49	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt	30894 11	30798 11					
30537 29	32937 29	32937 29	30538 10	32938 10	32938 10								30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30537 39	32937 39	32937 39	30538 13	32938 13	32938 13	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			30894 13	30798 13			
30537 41	32937 41	32937 41	30538 15	32938 15	32938 15								30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30537 43	32937 43	32937 43	30538 17	32938 17	32938 17	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt	30894 15	30798 15					
30537 49	32937 49	32937 49	30538 19	32938 19	32938 19								30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30538 10	32938 10	32938 10	30539 70	32939 70	32939 70	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			30894 17	30798 17			
30538 13	32938 13	32938 13	30539 73	32939 73	32939 73								30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30538 15	32938 15	32938 15	30539 75	32939 75	32939 75	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt	30894 19	30798 19					
30538 17	32938 17	32938 17											30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30538 19	32938 19	32938 19				30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			30894 21	30798 21			
30539 70	32939 70	32939 70											30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30539 73	32939 73	32939 73				30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt	30894 23	30798 23					
30539 75	32939 75	32939 75											30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
						30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			30894 25	30798 25			
													30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
						30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt	30894 27	30798 27					
													30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
						30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			30894 29	30798 29			
													30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
						30892 20	3079								

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30895 01— Con.	30799 01— Con.	3079J 61 pt Con.	30896 22— Con.	3079A 21— Con.	3079J 61 pt Con. 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt	30898 05— Con.	3079B 25— Con.	3079J 61 pt Con. 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32927 15	32927 15	32929 11 32929 21
		3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt							32927 31	32927 31	32929 31
									32927 33	32927 33	32929 33
30895 02	30799 02	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt	30896 23	3079A 23	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 06	3079B 26	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32927 34	32927 34	32929 34
									32927 36	32927 36	32929 36
									32927 41	32927 41	32929 41
30895 03	30799 03	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt	30896 24	3079A 25	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 07	3079B 27	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32927 78	32927 78	32929 51 32929 73 32929 75
									32927 98	32927 98	32928 13 32929 98
30896 11	3079A 11	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30896 25	3079A 27	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 08	3079B 28	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3179K 99	32961 11	32961 11	32963 11 32965 11
									32961 31	32961 31	32963 31 32965 31
									32961 35	32961 35	32963 35 32965 35
30896 12	3079A 12	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30896 26	3079A 28	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 09	3079B 29	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32961 38	32961 38	32963 38 32965 38
									32961 51	32961 51	32963 51 32965 51
									32961 61	32961 61	32963 61 32965 61
30896 13	3079A 13	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30896 27	2499A 94 3079A 29	2499A 94 3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30899 00	3079F 31	3079K 88	32961 98	32961 98	32963 98 32965 98
									32962 31	32962 31	32964 31 32966 31
									32962 34	32962 34	32964 34 32966 34
30896 14	3079A 14	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30897 01	3079F 25	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	3089A 12	3079F 43	3079K 93 pt 3079K 94 pt 3079K 95 pt 3079K 99 pt	32962 36	32962 36	32964 36 32966 36
									32962 45	32962 45	32964 45 32966 45
									32962 51	32962 51	32964 51 32966 51
30896 15	3079A 15	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30897 09	3079F 27	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	3089A 18	3079F 49	3079K 93 pt 3079K 94 pt 3079K 95 pt 3079K 99 pt	32962 61	32962 61	32964 61 32966 61
									32962 83	32962 83	32964 83 32966 83
									32962 98	32962 98	32964 98 32966 98
30896 16	3079A 16	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 01	3079B 21	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	32295 00	32295 00	32291 00 pt	33121 98	33121 98	33121 79 33121 85 33121 98
									3312A 11 3312A 23 3312A 25 3312A 27	3312A 11 3312A 23 3312A 25 3312A 27	3312A 00
									3312B 61 3312B 63 3312B 65 3312B 67	3312B 61 3312B 63 3312B 65 3312B 67	3312B 00
30896 17	3079A 17	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 02	3079B 22	3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32620 15	32620 15	32620 14 32620 52 pt	33151 22 33151 23	33151 22 33151 23	33151 21
									33152 01	33152 01	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt
									33152 03	33152 03	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt
30896 18	3079A 18	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 03	3079B 23	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32620 19	32620 19	32620 18 32620 52 pt	32752 11	32752 11	32752 00
									32917 23	32917 23	32917 22 32917 24
									32917 40	32917 40	32917 26 32917 28 32917 39
30896 19	3079A 19	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 04	3079B 24	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32630 15	32630 15	32630 14 32630 52 pt	32927 14	32927 14	32928 15 32928 17
30896 20	3079A 20	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 05	3079B 25	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt	32927 14	32927 14	32928 15 32928 17			
30896 21	3079A 21	3079J 61 pt 3079J 62 pt	30896 22	3079A 22	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt	32927 14	32927 14	32928 15 32928 17			
30896 22	3079A 22	3079J 61 pt 3079J 62 pt	30896 23	3079A 23	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt	32927 14	32927 14	32928 15 32928 17			



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33152 03— Con.	33152 03— Con.	33152 11 pt 34967 19 pt	33157 42— Con.	33157 42— Con.	33157 31 pt 33157 71 pt	33561 66— Con.	33561 66— Con.	33569 92— Con.	34236 21	34236 21	34233 21
						33562 78 33563 91 33569 91	33562 78 33563 91 33569 91		34236 31	34236 31	34233 31
33152 05	33152 05	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 13 pt 34967 17 pt 34967 19 pt	33157 43	33157 43	33157 31 pt 33157 61 pt 33157 71 pt				34236 41	34236 41	34233 41
						33630 00	33611 00	33611 00	34236 81	34236 81	34238 81
			33159 44 33159 45 33159 48	33159 44 33159 45 33159 48	33159 49	33640 11	33620 42	33620 42	34236 99	34236 99	34233 99
						33640 21	33691 51	33691 51			
33152 07	33152 07	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33159 99	33159 99	33159 77 33159 98	33640 31	33692 31	33692 31	34292 12 34298 99	34292 12 34298 99	34298 98
			33211 21	33211 21	33211 22 pt 33211 24 pt 33211 27 pt 33211 30 pt	33640 41	33693 71	33693 71	34320 01 34320 03	34320 01 34320 03	34320 04
						33640 51	33693 91	33693 91	34320 05 34320 07	34320 05 34320 07	34320 06
			33211 23	33211 23	33211 22 pt 33211 24 pt 33211 27 pt 33211 30 pt	33650 11	33612 11	33612 11			
33152 09	33152 09	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt				33650 31	33612 31	33612 31	34320 09 34320 11	34320 09 34320 11	34320 08
						33650 51	33612 51	33612 51	34320 14 34320 25 34320 35	34320 14 34320 25 34320 35	34320 98
			33211 25	33211 25	33211 33 pt 33211 36 pt 33211 39 pt 33211 42 pt	33650 61	33612 61	33612 61	34320 47 34320 48	34320 47 34320 48	34320 79
						33650 73	33612 73	33612 73			
33152 10	33152 10	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33211 26	33211 26	33211 33 pt 33211 36 pt 33211 39 pt 33211 42 pt	33660 20	33620 20	33620 20	34320 67 34320 69	34320 67 34320 69	34320 65
						33660 21	33620 21	33620 21			
			33217 31	33217 31	33217 32 pt 33217 34 pt 33217 37 pt 33217 40 pt	33660 22	33620 22	33620 22	34320 71 34320 74 34320 75	34320 71 34320 74 34320 75	34320 98
						33660 23	33620 23	33620 23			
33152 12	33152 12	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33217 33	33217 33	33217 32 pt 33217 34 pt 33217 37 pt 33217 40 pt	33660 24	33620 24	33620 24	34320 76 34320 78	34320 76 34320 78	34320 77
						33660 25	33620 25	33620 25	34320 80 34320 82	34320 80 34320 82	34320 55
						33660 31	33620 31	33620 31			
			33217 35	33217 35	33217 43 pt 33217 46 pt 33217 49 pt 33217 52 pt	33660 41	33620 52	33620 61 pt	34320 84 34320 86	34320 84 34320 86	34320 56
33152 14	33152 14	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33217 36	33217 36	33217 43 pt 33217 46 pt 33217 49 pt 33217 52 pt	33660 51	33620 51	33620 51	34320 87	34320 87	34320 98 pt
						33660 61	33620 61 pt	33620 61 pt	34320 90 34320 91	34320 90 34320 91	34320 40
						33660 72	33620 72	33620 72			
						33690 11	33691 61	33691 61	34320 92 34320 93	34320 92 34320 93	34320 42
33152 16	33152 16	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33252 11	33252 11	33252 12 33252 13	33690 15	33692 11	33692 11	34320 94 34320 95	34320 94 34320 95	34320 43
			33391 00	33331 00	33331 00	33690 21	33692 33	33692 33	34320 96 34320 97	34320 96 34320 97	34320 44
			33392 31	33334 31	33334 31	33690 25	33692 41	33692 41			
			33392 37	33334 37	33334 35 pt	33690 91 33690 98	33693 94 33693 99	33693 99	34320 99	34320 99	34320 98 pt
33152 22	33152 22	33152 33 pt 34967 23 pt	33392 39	33334 39	33334 38 pt	33991 91 33991 98	33991 91 33991 98	33991 99	34432 44	34432 44	34432 45
			33392 41	33334 41	33334 41				34432 46 34432 48	34432 46 34432 48	34432 47
33152 23	33152 23	33152 23 34967 19 pt	33392 43	33334 43	33334 45 pt	34234 11	34234 11	34232 31			
									34432 52 34432 54 34432 56 34432 98	34432 52 34432 54 34432 56 34432 98	34432 99
33152 25	33152 25	33152 25 34967 21	33392 49	33334 49	33334 48 pt	34234 22	34234 22	34232 83			
						34234 33	34234 33	34232 85			
33152 30	33152 30	33152 33 pt 34967 23 pt	33392 51	33334 51	33334 35 pt 33334 38 pt 33334 45 pt 33334 48 pt	34234 44 34234 98	34234 44 34234 98	34232 99	34433 13	34433 13	34433 12 34433 14 34433 48 pt
33156 15 33156 17	33156 15 33156 17	33156 13	33392 55	33334 55	33334 55	34235 11	34235 11	34232 53	34433 17	34433 17	34433 16 34433 18 34433 48 pt
33156 22 33156 24	33156 22 33156 24	33156 21	33398 01	33321 00	33321 00	34235 12	34235 12	34232 54			
			33398 05	33323 00	33323 00	34235 21	34235 21	34232 56	34433 22	34433 22	34433 21 34433 23 34433 48 pt
33157 21	33157 21	33157 31 pt 33157 61 pt 33157 71 pt	33398 73	33398 73	33399 85	34235 22	34235 22	34232 58			
			33398 99	33398 99	33398 23 33398 98 33399 81	34235 31	34235 31 35533 81	34232 99 pt 35531 85 pt 35532 81 pt	34433 32	34433 32	34433 31 34433 33 34433 48 pt
33157 23	33157 23	33157 31 pt 33157 61 pt 33157 71 pt	33416 99	33416 99	33416 51 33416 98	34235 33	34235 33 35533 83	34232 99 pt 35531 85 pt 35532 81 pt	34433 38	34433 38	34433 45
			33542 61	33542 61	33542 51 pt 33542 53 pt				34433 39 34433 49 34433 50	34433 39 34433 49 34433 50	34433 48 pt
33157 41	33157 41	33157 31 pt 33157 61 pt 33157 71 pt	33542 63	33542 63	33542 51 pt 33542 53 pt	34235 39	34235 39 35533 84	34232 99 pt 35531 85 pt 35532 81 pt			
						34236 11	34236 11	34233 11	34434 13	34434 13	34434 12 pt
33157 42	33157 42	33157 31 pt 33157 61 pt	33561 66	33561 66	33569 92				34434 15	34434 15	34434 18 pt

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34434 17	34434 17	34434 12 pt	34463 12	34463 12	34460 46	34913 35	3494A 45	3494A 45	34931 57	34931 57	34931 56 34931 58
34434 19	34434 19	34434 18 pt	34463 20 34463 22	34463 20 34463 22	34460 49	34913 47	3494A 46	3494A 46	34931 99	34931 99	34931 63 34931 98
34435 21 34435 23	34435 21 34435 23	34435 20	34464 10	34464 10	34460 54 pt 34460 56 pt	34913 59	3494A 47	3494A 47	34932 10 34932 20	34932 10 34932 20	34932 00
34435 31 34435 33	34435 31 34435 33	34435 35	34464 13	34464 13	34460 54 pt 34460 56 pt	34913 61	3494A 49	3494A 49	34944 21	34944 21	34944 11
34435 37 34435 39	34435 37 34435 39	34435 38	34464 16	34464 16	34460 54 pt 34460 56 pt	34914 11	3494A 51	3494A 51	34944 31 34944 41 34944 51 34944 99	34944 31 34944 41 34944 51 34944 99	34944 19
34438 03 34438 05	34438 03 34438 05	34438 04	34464 18	34464 18	34460 54 pt 34460 56 pt	34914 13	3494A 52	3494A 52	34945 12 34945 14 34945 16 34945 17 34945 99	34945 12 34945 14 34945 16 34945 17 34945 99	34945 98
34438 14 34438 16	34438 14 34438 16	34438 15	34465 10	34465 10	34460 54 pt	34914 15	3494A 53	3494A 53	34961 22 34961 31	34961 22 34961 31	34961 21
34438 17 34438 19	34438 17 34438 19	34438 18	34465 12	34465 12	34460 56 pt	34914 17	3494A 54	3494A 54	34964 41 34964 43	34964 41 34964 43	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34439 15 34439 17 34439 19	34439 15 34439 17 34439 19	34439 21	34465 30	34465 30	34460 62	34914 21	3494A 55	3494A 55	34964 51 34964 53	34964 51 34964 53	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34439 31 34439 32 34439 33 34439 34	34439 31 34439 32 34439 33 34439 34	34439 30	34482 11	34482 11	34482 17 34482 27	34914 23	3494A 56	3494A 56	34964 61 34964 63	34964 61 34964 63	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34439 51 34439 53	34439 51 34439 53	34439 56	34625 11 34625 13 34625 15 34625 17	34625 11 34625 13 34625 15 34625 17	34625 00	34914 25	3494A 57	3494A 57	34964 65 34964 67	34964 65 34964 67	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34441 21	34441 21	34446 37	34626 11 34626 13 34626 15 34626 17	34626 11 34626 13 34626 15 34626 17	34626 00	34915 11	3494A 61	3494A 61	34964 71 34964 73	34964 71 34964 73	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34441 23	34441 23	34446 36	34627 11 34627 13 34627 15 34627 17	34627 11 34627 13 34627 15 34627 17	34627 00	34915 23	3494A 63	3494A 63	34964 75 34964 77	34964 75 34964 77	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34441 27	34441 27	34446 34	34628 11 34628 13 34628 15 34628 17	34628 11 34628 13 34628 15 34628 17	34628 00	34915 35	3494A 65	3494A 65	34964 79 34964 81	34964 79 34964 81	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34441 29	34441 29	34446 32	34692 20 34692 88 34692 98	34692 20 34692 88 34692 98	34692 99	34916 11	3494A 31	3494A 31	34964 83 34964 85	34964 83 34964 85	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34443 11 34443 13	34443 11 34443 13	34446 21	34696 00 34699 98	34696 00 34699 98	34699 99	34916 23	3494A 32	3494A 32	34964 87 34964 89	34964 87 34964 89	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34443 21 34443 23	34443 21 34443 23	34446 25	34790 10 34790 11 34790 21	34790 10 34790 11 34790 21	34790 19	34916 41	3494A 35	3494A 35	34966 23 34966 25	34966 23 34966 25	34966 13
34447 21	34447 21	34446 47	34790 73 34790 75	34790 73 34790 75	34790 71	34916 53	3494A 36	3494A 36	34966 27 34966 29	34966 27 34966 29	34966 21
34447 25	34447 25	34446 46	34911 11	3494A 11	3494A 11	34916 65	3494A 38	3494A 38	34968 45 34968 46 34968 47	34968 45 34968 46 34968 47	34968 49
34447 31	34447 31	34446 11	34911 21	3494A 12	3494A 12	34917 11	34949 11	34949 11	34968 81 34968 83 34968 85	34968 81 34968 83 34968 85	34968 98
34447 41	34447 41	34446 51	34911 23	3494A 13	3494A 13	34917 13	34949 13	34949 13	34992 13	34992 13	34992 12 34992 19
34448 11	34448 11	34446 62 pt	34911 34	3494A 14	3494A 14	34917 15	34949 15	34949 15	34995 21	34995 21	34995 13 34995 15
34448 13 34448 19	34448 13 34448 19	34446 64 pt	34911 38	3494A 15	3494A 15	34917 27	34949 27	34949 21 34949 23 34949 25	34995 31 34995 39	34995 31 34995 39	34995 19
34449 31	34449 31	34446 15	34912 01	3494A 21	3494A 21	34917 39	34949 39	34949 39	34998 25 34998 99	34998 25 34998 99	34998 98
34449 41	34449 41	34446 62 pt 34446 64 pt	34912 11	3494A 22	3494A 22	34917 98	34949 98	34949 98	35111 01 35111 02	35111 01 35111 02	35111 00
34449 53	34449 53	34446 44	34912 21	3494A 23	3494A 23	34918 00	34947 00	34947 00	35112 00	35112 00	35112 00 pt
34449 55	34449 55	34446 42	34912 23	3494A 24	3494A 24	34919 00	34948 00	34948 00	35112 21	35112 21	35112 01 pt 35112 15 35112 16
34449 62	34449 62	34446 62 pt	34912 35	3494A 26	3494A 26	34921 00	3494B 00	3494B 00	35112 22	35112 22	35112 01 pt 35112 17
34449 65	34449 65	34446 64 pt	34912 41	3494A 27	3494A 27	34922 00	3494C 00	3494C 00	35112 23	35112 23	35112 08 35112 18
34449 98	34449 98	34446 98	34912 43	3494A 29	3494A 29	34923 00	3494D 00	3494D 00	35112 24	35112 24	35112 09 35112 19
34461 10	34461 10	34460 07	34913 11	3494A 39	3494A 39	34924 00	3494E 00	3494E 00			
34461 12	34461 12	34460 09	34912 43	3494A 29	3494A 29	34925 00	3494F 00	3494F 00			
34461 15	34461 15	34460 12	34913 23	3494A 43	3494A 43	34926 00	3494G 00	3494G 00			
34461 17	34461 17	34460 17	34912 35	3494A 26	3494A 26	34927 00	3494H 00	3494H 00			
34462 10	34462 10	34460 31									
34462 12	34462 12	34460 36									
34462 22	34462 22	34460 22									
34462 26	34462 26	34460 51									
34463 10	34463 10	34460 41									



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35112 74	35112 74	35112 75 pt	3531E 00	3531E 00	35314 00 pt	35337 22 35337 23	35337 22 35337 23	35331 41	35364 03	35364 03	35362 09 35362 15 pt
35112 76	35112 76	35112 75 pt 35112 77	3531F 00	3531F 00	35316 00	35337 24 35337 25	35337 24 35337 25	35331 46	35364 04	35364 04	35362 11 35362 15 pt
35112 79 35112 83	35112 79 35112 83	35112 00 pt	3531G 00	3531G 00	35318 00 pt						
35199 01 35199 01	35199 01 35199 01	35199 98 pt	3531H 00	3531H 00	35313 00 pt 35318 00 pt 35319 85	35337 26 35337 27	35337 26 35337 27	35331 43	35364 05	35364 05	35362 13 35362 15 pt
						35337 44	35337 44	35331 44			
35199 33	35199 26	35199 26	3531K 06	3531K 06	35319 06	35337 45	35337 45	35331 45	35364 06	35364 06	35362 14 35362 15 pt
35199 41 35199 42	35199 41 35199 42	35199 03	3531K 07	3531K 07	35319 07	35337 47	35337 47	35331 47	35364 17	35364 17	35362 55 pt
35199 43 35199 44	35199 43 35199 44	35199 04	3531K 11	3531K 11	35319 11	35337 48	35337 48	35331 48	35364 52	35364 52	35362 52
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						35337 61	35337 61	35332 61 pt	35373 01 35373 02	35373 01 35373 02	35371 23 pt
35199 47	35199 47	35199 06 pt 35199 07 pt	3531K 22 3531K 24	3531K 22 3531K 24	35319 23	35338 31	35338 31	35332 31	35373 03	35373 03	35371 11 pt
35199 48	35199 48	35199 06 pt 35199 07 pt	3531K 25	3531K 25	35319 25	35338 51	35338 51	35332 51	35373 05	35373 05	35371 36 pt 35371 37 pt 35371 38 pt
						35338 55	35338 55	35332 55			
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35199 53 35199 54	35199 53 35199 54	35199 15	3531K 53 3531K 55	3531K 53 3531K 55	35319 52	35338 99	35338 99	35332 61 pt			
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35199 91	35199 91	35199 22 pt 35199 23 pt 35199 28 pt 35199 29 pt 35199 98 pt	3531K 90	3531K 40 35373 90	35319 41 35371 91 35371 93	35339 55	35339 55	35333 55			
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35199 92	35199 92	35199 22 pt 35199 23 pt 35199 28 pt 35199 29 pt 35199 98 pt	3531M 01	3531M 01	35313 00 pt	35339 61	35339 61	35333 61	35373 19	35373 19	35371 65
			3531M 03	3531M 03	35314 00 pt	35339 65	35339 65	35333 65	35373 21	35373 21	35371 55
			3531M 05	3531M 05	35319 84 pt 35319 86 pt	35339 71	35339 71	35333 71	35373 25	35373 25	35371 99 pt
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						35339 98	35339 98	35333 98	35373 28	35373 28	35371 81
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35239 53	35239 53	35239 50 35239 51	3531M 15	3531M 19	35319 84 pt 35319 86 pt 35374 15 35372 85 pt	3533B 21	3533B 21	35336 21	35373 32	35373 32	35371 85
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3531A 00	3531A 00	35311 00	35337 15	35337 15	35331 15	35364 01	35364 01	35362 07 35362 15 pt	35424 03 35424 04 35424 05	35424 03 35424 04 35424 05	35424 75
3531B 00	3531B 00	35312 00	35337 16	35337 16	35331 16	35364 02	35364 02	35362 08 35362 15 pt	35430 11	35650 11	35650 11
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			35337 21	35337 21	35331 21						



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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
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35442 16	35442 16	35442 25 pt				35485 07	35495 55	35495 55	35543 11	35543 11	35541 49 pt 35542 73 pt
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			35481 06	36231 35	36231 35	35495 92 35495 95	35495 92 35495 95	35495 98	35543 15	35543 15	35541 41 35541 43 35541 49 pt 35542 73 pt
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35454 37	35454 37	35453 37							35543 24	35543 24	35541 54 pt 35541 59 pt 35542 73 pt
35454 38	35454 38	35453 38	35482 03	36232 11	36232 11	35522 79	35522 79	35522 72 35522 99	35543 25	35543 25	35541 54 pt 35541 59 pt 35542 73 pt
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35455 11	35455 11	35452 11	35482 11	36232 52	36232 52	35533 25 35533 27	35533 25 35533 27	35531 75 pt	35544 05	35544 05	35542 87
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35455 15	35455 15	35452 15	35482 13	36232 55	36232 55	35533 31	35533 31	35531 73 pt			
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35455 21	35455 21	35452 21	35482 15	36232 62	36232 61 36232 65	35533 35 35533 37	35533 35 35533 37	35531 98 pt			
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35455 65	35455 65	35452 65							35553 09	35553 09	35553 45 35553 52 35553 57
35455 71	35455 71	35452 71	35483 05	36233 13	36233 13						
35455 81 35455 83	35455 81 35455 83	35452 99 pt	35483 06	36233 23	36233 23	35533 87	35533 87	35531 87	35558 02 35558 09	35558 02 35558 09	35557 01
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35455 93	35455 93	35452 99 pt	35483 08	36233 52	36233 52				35558 83	35558 83	35557 83
35455 94	35455 94	35452 94	35483 09	36233 61	36233 61	35534 04 35534 05 35534 06 35534 07 35534 08 35534 09	35534 04 35534 05 35534 06 35534 07 35534 08 35534 09	35532 98	35558 85	35558 85	35557 85
35455 95	35455 95	35452 95	35483 11	36233 71	36233 71				35558 87	35558 87	35557 87
35455 96 35455 97 35455 98	35455 96 35455 97 35455 98	35452 99 pt	35483 19	36233 81	36233 81				35558 89	35558 89	35557 89
			35484 01	35496 01	35496 01	35534 11	35534 11	35532 81 pt	35558 99	35558 99	35557 99
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35462 47	35462 47	35462 45 35462 49	35484 04	35496 15	35496 15	35543 02	35543 02	35541 21 35542 73 pt	35561 05	35511 05	35511 73
			35484 05	35496 17	35496 17				35561 06	35511 06	35511 83



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35561 07	35511 07	35511 91	35593 01	35593 11	35593 11	35599 13	35599 13	35595 41 pt 35595 98 pt	35616 00	35616 00	3561C 00
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35561 09	35511 09	35511 41 pt	35593 05	35593 32	35593 32				35646 10 35646 20	35646 10 35646 20	35646 00
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35562 31	35512 31	35512 31	35593 15	35593 61	35593 61	35599 25	35599 25	35595 41 pt 35595 98 pt	35651 04	35514 29 35691 29	35514 29 35691 29
35562 41	35512 41	35512 41	35593 17	35593 71	35593 71				35651 05	35514 30 35691 30	35514 30 35691 30
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35562 65	35512 65	35512 61 35512 92 pt	35593 21 35593 23 35593 25	35593 21 35593 23 35593 25	35593 79	35599 31 35599 33	35599 31 35599 33	35595 45	35651 07	35514 33 35691 33	35514 33 35691 33
35562 71	35512 71	35512 71	35593 27 35593 28 35593 29	35593 27 35593 28 35593 29	35593 81				35651 08	35514 35 35691 35	35514 35 35691 35
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35562 85	35512 85	35512 92 pt	35594 03	35594 31	35594 31	35599 39 35599 41	35599 39 35599 41	35595 43	35651 10	35514 42 35691 42	35514 42 35691 42
35562 91	35512 91	35512 87 35512 92 pt	35594 05	35594 51	35594 51	35599 43 35599 45	35599 43 35599 45	35595 52	35651 11	35514 52 35691 52	35514 52 35691 52
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35563 08	35513 08	35513 49	35596 21 35596 23 35596 25	35596 21 35596 23 35596 25	35596 23				35651 18	35514 82 35691 82	35514 82 35691 82
35563 09	35513 09	35513 59 pt	35596 27 35596 29 35596 31 35596 33 35596 35	35596 27 35596 29 35596 31 35596 33 35596 35	35596 27	35599 71 35599 73 35599 75	35599 71 35599 73 35599 75	35595 82 pt 35595 84 pt 35595 86 pt	35651 19	35514 83 35691 83	35514 83 35691 83
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35563 12	35513 12	35513 23 pt 35513 59 pt	35596 47 35596 49 35596 51	35596 47 35596 49 35596 51	35596 33				35651 22	35514 11	35513 83 pt 35514 91 35691 91
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35563 14	35513 14	35513 59 pt	35597 02	35494 03	35494 03	35599 82 35599 87	35599 82 35599 87	35595 62 pt 35595 98 pt	35674 02	35674 02	35674 17
35563 15	35513 15	35513 29 35513 59 pt	35597 03	35494 05	35494 05				35674 03	35674 03	35674 19 pt 35674 31 pt
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35591 01 35591 03 35591 05	35591 01 35591 03 35591 05	35591 00 pt	35597 05	35494 09	35494 09	35599 88 35599 89	36362 74 36362 75	36362 74 36362 75	35675 01	35675 01	35675 51
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35591 13	35591 13 35698 34	35591 00 pt 35699 97 pt	35599 01 35599 03	35599 01 35599 03	35595 11				35676 00	35676 00	35672 00 pt
35591 15	35591 15	35591 00 pt	35599 05 35599 07	35599 05 35599 07	35595 21	35599 99 35599 11	35599 99 35599 11	35595 88 35595 98 pt	35676 01	35676 01	35672 11
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35592 03	35592 33	35592 33									
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35592 07	35592 54	35592 54									
35592 09 35592 11	35592 09 35592 11	35592 98 pt									
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35592 19	35592 97	35592 97									



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35676 03	35676 03	35672 61	35752 00	35733 40	35734 30 pt 35735 51 pt	35892 99	35892 99	35892 93 pt	35963 05	35763 05	35760 63
35676 04	35676 04	35672 00 pt	35771 00	35732 30 35732 61	35732 00 pt	35893 01 35893 02	35893 01 35893 02	35893 11	35963 09	35763 09	35760 84
35676 05	35676 05	35672 41 pt	35772 00	35733 30	35734 30 pt 35735 51 pt	35893 08 35893 09	35893 08 35893 09	35893 98	36122 02 36122 04 36122 06 36122 14 36122 16 36122 19 36122 21 36122 23 36122 28 36122 29	36122 02 36122 04 36122 06 36122 14 36122 16 36122 19 36122 21 36122 23 36122 28 36122 29	36122 00
35676 06	35676 06	35672 00 pt	35781 00	35733 60	35734 30 pt 35735 51 pt 35735 51 pt	35921 01 35921 02	35921 01 35921 02	35921 11 35921 13	36122 32 36122 33 36122 37 36122 39 36122 41 36122 42 36122 43 36122 44	36122 32 36122 33 36122 37 36122 39 36122 41 36122 42 36122 43 36122 44	
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35681 11 35681 13	35681 11 35681 13	35681 15	35782 00	35744 00	35744 00	35922 01	35922 01	35922 72	36126 01 36126 02 36126 03 36126 04 36126 05 36126 09	36126 01 36126 02 36126 03 36126 04 36126 05 36126 09	36125 00 pt
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35683 98	35683 98	35683 91 35683 99 pt	3579A 00	3579A 00	3579A 20 3579A 40 3579A 41 3579A 44 3579A 50 3579A 55	35922 03	35922 03	35922 51	36126 01 36126 02 36126 03 36126 04 36126 05 36126 09	36126 01 36126 02 36126 03 36126 04 36126 05 36126 09	36125 00 pt
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35698 25 35698 26	35698 25 35698 26	35699 71	35892 07	35892 07	35892 93 pt	35961 13	35761 13	35760 26	36291 13	36293 01	36293 13 36293 15
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35698 31 35698 32	35698 31 35698 32	35699 74	35892 27	35892 27	35892 93 pt	35961 17	35761 17	35760 30	36291 17	36293 03 36293 04 36293 05 36293 09	36293 99
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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
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36489 12	36489 12	36489 11 pt 36489 19 pt	36941 03	36941 03	36941 31				37131 43	37131 30	37131 30
			36941 04	36941 04	36941 35				37131 49	37131 49	37131 12 pt 37131 25
36489 16	36489 16	36489 11 pt	36942 01	36942 01	36942 14 36942 28 pt				37131 53	37131 33	37131 33
36489 17	36489 17	36489 19 pt	36942 02	36942 02	36942 28 pt	37112 07	37112 07	37112 11 pt 37112 13 pt 37112 15 pt	37131 55	37131 34	37131 34
36520 00	36520 00	36521 00 36521 19	36942 03	36942 03	36942 27 36942 28 pt	37112 08	37112 08	37112 23 pt 37112 25 pt 37112 26 pt	37131 57	37131 54	37131 54
			36942 04	36942 04	36942 37 36942 41 36942 42				37131 61	37131 36	37131 36
36520 01	36520 01	36521 01 pt 36521 02 pt				37112 09	37112 09	37112 11 pt 37112 13 pt 37112 15 pt 37112 17 pt 37112 21 pt 37112 23 pt 37112 25 pt 37112 26 pt	37131 62	37131 38	37131 38
36520 03	36520 03	36521 01 pt 36521 02 pt	36943 01	36943 01	36943 11 36943 42 pt				37131 63	37131 56	37131 56
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36631 00	36621 00 36629 41	36621 00 36629 00 pt	36949 19	36949 19	36949 09 pt				37132 09	37132 09	
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36692 00	36626 00	36626 00							37132 12	37132 12	
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36714 00	36714 00	36711 00 36712 00	36995 00	36629 30	36629 00 pt				37132 14	37132 14	
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36720 00	36797 00	36797 00							37132 16	37132 16	
36799 20	36799 20 36629 42	36629 00 pt 36799 00 pt	36998 01	36994 51	36994 51				37132 17	37132 17	
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36799 30	36799 30	36799 00 pt	36998 03	36994 72	36994 96 pt				37132 19	37132 19	
36913 17	36913 17	36913 15 36913 16	36998 04	36994 82	36994 82				37132 20	37132 20	
36914 25	36914 25	36914 21 36914 29	36998 05	36994 83	36994 83	37113 01	37113 01	37113 13 pt 37113 15 pt	37132 21	37132 21	
36915 01	36915 01	36915 72 36915 75	36998 06	36994 84	36994 84	37113 02	37113 02	37113 13 pt 37113 15 pt	37132 22	37132 22	
			36998 07	36994 85	36994 85				37132 23	37132 23	
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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
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3714A 02	3714A 02	37143 21				37433 04	37433 69	37433 69	38122 00	36625 30 36629 44	36625 00 pt 36629 00 pt
3714A 03	3714A 03	37143 23	37322 23	37322 23	37322 47	37433 11	37433 71	37433 71	38210 10	38112 00	38112 00
3714A 04	3714A 04	37143 26	37322 25	37322 25	37322 48	37433 12 37433 13 37433 14 37433 15	37433 12 37433 13 37433 14 37433 15	37433 79	38210 20	38113 20	38113 00 pt
3714A 05 3714A 06	3714A 05 3714A 06	37143 49 pt	37322 27 37322 28	37322 27 37322 28	37322 55 pt				38244 00	38244 00	38244 11 38244 21 38244 31 38244 99
3714A 07	3714A 07	37143 44	37322 29	37322 29	37322 53 37322 55 pt 37322 61	37511 01	37511 11	37511 11			
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3714A 09	3714A 09	37143 46	37323 03	37323 03	37323 11 pt 37323 30	37511 03	37511 31	37511 31	38271 00	38324 00	38324 00
3714A 10	3714A 10	37143 47	37323 05	37323 05	37323 11 pt 37323 35	37511 04	37511 42	37511 42	38272 00	38325 30	38325 00
3714A 11	3714A 11	37143 48				37511 05	37511 44	37511 44	38273 00	38325 40	
3714A 12 3714A 13 3714A 19	3714A 12 3714A 13 3714A 19	37143 49 pt	37323 07	37323 07	37323 11 pt 37323 50	37511 06	37511 51	37511 51	38295 10	38293 00	38293 00
37151 00	37151 00	37151 10 37151 50	37323 09	37323 09	37323 11 pt 37323 54	37511 09	37511 59	37511 59	38295 20	36625 20	36625 00 pt
									38296 00	38113 10	38113 00 pt
37152 01 37152 02	37152 01 37152 02	37152 00	37323 13	37323 13	37323 11 pt 37323 56	37511 10 37511 12 37511 13 37511 14 37511 15 37511 16 37511 19	37511 10 37511 12 37511 13 37511 14 37511 15 37511 16 37511 19	37511 71	38411 42	38411 42	38411 41 38411 45 38411 46
37211 00	37211 00	37211 21 37211 23 37211 28	37323 15	37323 15	37323 11 pt 37323 58				38411 72	38411 72	38411 71 pt
37244 01 37244 02	37244 01 37244 02	37244 13	37323 17	37323 17	37323 11 pt 37323 70 37323 75	37512 01	37512 01	37512 14 37512 17	38411 85	38411 85	38411 82 38411 83
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37311 01	37311 01	37311 11 pt 37311 21	37324 03	37324 03	37324 18 pt 37324 20 pt 37324 25 pt	37612 02	37612 02	37612 35 37612 45	38411 99	38411 99	38411 71 pt 38411 84 pt 38411 98 pt
37311 02	37311 02	37311 11 pt 37311 31				37614 01	37614 13	37614 13			
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37311 04	37311 04	37311 11 pt 37311 51				37615 01	37615 11	37615 11	38421 03	38421 03	38421 99 pt
37311 05	37311 05	37311 11 pt 37311 61	37324 07	37324 07	37324 18 pt 37324 20 pt 37324 25 pt	37615 02	37615 13	37615 13	38421 04	38421 04	38421 11 pt
37311 06	37311 06	37311 81 pt				37615 03	37615 03	37615 15 37615 23	38421 05	38421 41	38421 41
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37311 09	37311 09	37311 11 pt 37311 81 pt				37927 01	37927 01	37927 22 37927 25 pt 37927 32 37927 35 pt	38421 07	38421 71	38421 71
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38517 10	38517 10		38731 11	38731 11	38737 19	39153 31	39153 31	39151 51 pt	39610 95	39610 95	
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38615 02	38615 02	38615 63	39113 41	39113 41	39112 41 pt	39495 81	39495 81	39495 99 pt	39656 21	39642 21	39642 21
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			39142 69	39142 69	39142 61 pt						



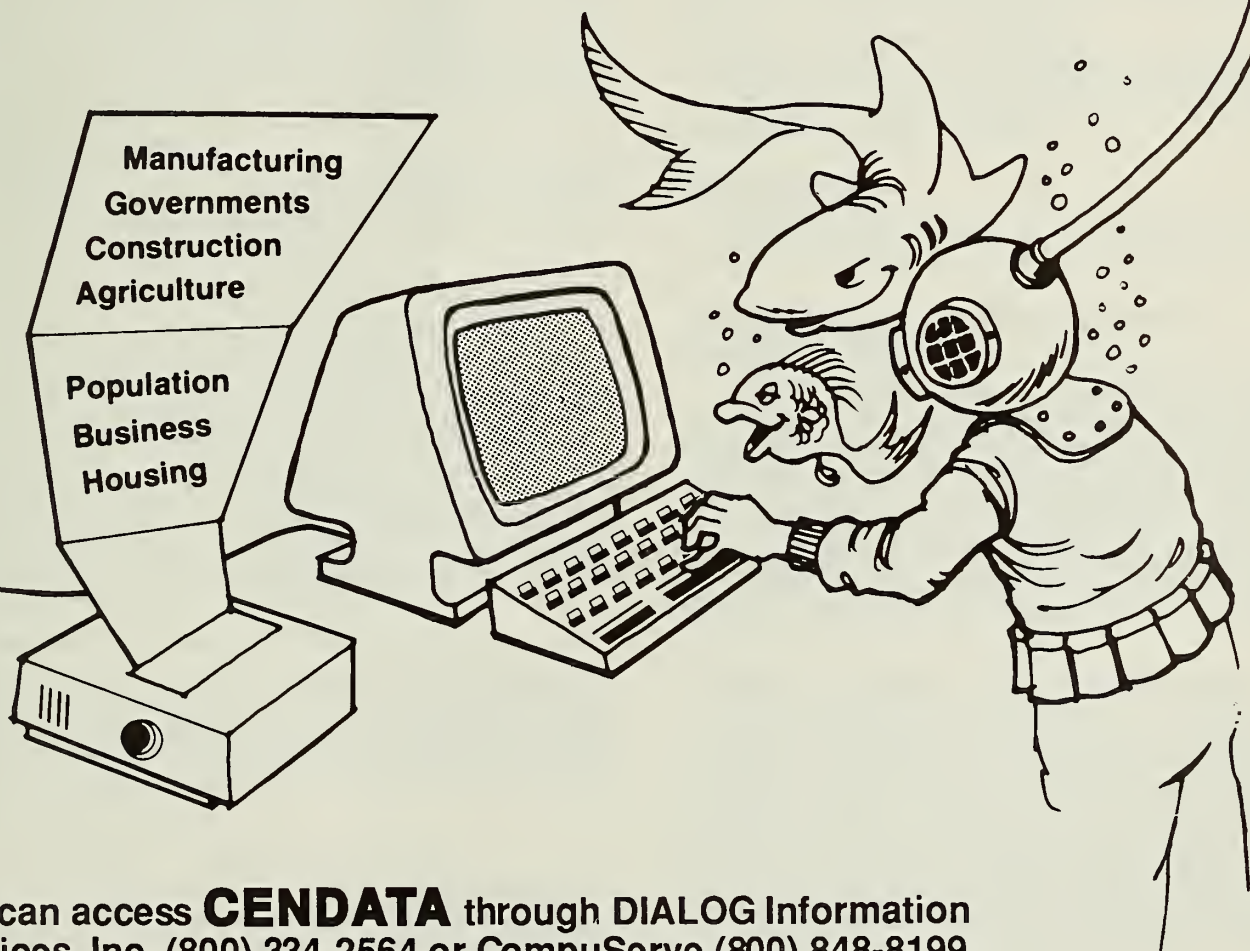


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# PUBLICATION PROGRAM

## 1987 CENSUS OF MANUFACTURES

Publications of the 1987 Census of Manufactures, containing preliminary and final data on manufacturing establishments in the United States, are described below. Publications order forms for the specific reports may be obtained from any Department of Commerce district office or from Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, DC 20233.

### Preliminary Reports

#### Industry series—83 reports (MC87-I-20A(P) to -39D(P))

Preliminary industry data are issued in 83 separate reports covering 459 industries. Preliminary summary data for the U.S. and States are released in one report.

### Final Reports

#### Industry series—83 reports (MC87-1-20A to -39D)

Each of the 83 reports provides information for a group of related industries ("dairy products" includes industries for butter, cheese, milk, etc.). Final figures for the United States are shown for each of the 459 manufacturing industries on quantity and value of products shipped and materials consumed, cost of fuels and electric energy, capital expenditures, assets, rents, inventories, employment, payroll, payroll supplements, hours worked, value added by manufacture, number of establishments, and number of companies. Comparative statistics for earlier years are provided where available.

For each industry, data on value of shipments, value added by manufacture, capital expenditures, employment, and payroll are shown by employment-size class of establishment, State, and degree of primary product specialization.

#### Geographic area series—51 reports (MC87-A-1 to -51)

A separate report is being published for each State and the District of Columbia. Each report presents data for industry groups and industries on value of shipments, cost of materials, value added by manufacture, employment, payroll, hours worked, new capital expenditures, and number of manufacturing establishments for the State, MSA's, counties, and selected places. Comparative statistics for earlier census years are shown for the State and large MSA's. Manufacturing totals are presented for each county and for places with significant manufacturing activity. Detailed statistics (including inventories, assets, rents, and energy costs) are presented only in statewide totals.

#### Subject series—7 reports (MC87-S-1 to -7)

Each of the seven reports contains detailed statistics for an individual subject, such as concentration ratios in manufacturing, type of organization, water use in manufacturing, textile machinery in place, distribution of sales by class of customer, manufacturers' shipments to the Federal Government, and a general national-level summary.

#### Reference series—1 report (MC87-R-1)

The Numerical List of Manufactured and Mineral Products includes a description of the principal products and services published in the 1987 Censuses of Manufactures and Mineral Industries.

#### Location of Manufacturing Plants—1 report (MC87-LM)

This report includes data for number of establishments by four-digit SIC industry and by employment-size class for counties, incorporated places of 2,500 inhabitants or more, and zip codes for each State. (This report is available only on magnetic tape and CD-ROM.)

### Analytical Reports—3 reports (AR87-1 to -3)

#### Exports From Manufacturing Establishments (AR87-1)

This report presents data on exports by two- and three-digit SIC industry groups for the United States and States. Information is presented on value of direct report shipments and estimates of the employment required to manufacture these products. Included are estimates of employment in manufacturing and nonmanufacturing establishments that supply parts, materials, and services for production of manufactured exports.

#### Selected Characteristics of Manufacturing Establishments That Export (AR87-2)

This report presents data on the number of manufacturing companies and establishments that export by major group, State, employment size, and ratios of exports to shipments.

#### Indexes of Production (AR87-3)

The indexes presented in this report are designed to measure the change in physical output of each manufacturing and mineral industry between 1982 and 1987.

### MICROFICHE

Every final published report in the 1987 Census of Manufactures will be available on microfiche.

### PUBLIC-USE COMPUTER TAPES AND COMPACT DISCS

Data from the final industry series, geographic area series, and the Location of Manufacturing Plants report will be available on public-use computer tapes and compact discs-read only memory (CD-ROM). These tapes will provide the same information found in the final reports. Computerized data products are available for users who wish to summarize, rearrange, or process large amounts of data. These products, with corresponding technical documentation, are sold by Data User Services Division, Customer Services (Tapes), Bureau of the Census, Washington, DC 20233.

### OTHER ECONOMIC CENSUSES REPORTS

Data on retail trade, wholesale trade, service industries, construction industries, mineral industries, transportation, enterprise statistics, minority-owned businesses, and women-owned businesses also are available from the 1987 Economic Censuses. A separate series of reports covers the censuses of outlying areas—Puerto Rico, Virgin Islands of the United States, Guam, and the Northern Mariana Islands. Separate announcements describing these reports are available free of charge from Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, DC 20233.













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